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THE ANNALS

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INCLUDING

ZOOLOGY, BOTANY, AND GEOLOGY.

(BEING A CONTINUATION OF THE 'MAGAZINE OF BOTANY AND ZOOLOGY,' AND OF LOUDON AND CHARLESWORTH'S 'MAGAZINE OF NATURAL HISTORY.')

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1844.

"Omnes res creatæ sunt divinæ sapientiæ et potentiæ testes, divitiæ felicitatis humanæ:—ex harum usu *bonitas* Creatoris; ex pulchritudine *sapientia* Domini; ex œconomiâ in conservatione, proportione, renovatione, *potentia* majestatis elucet. Earum itaque indagatio ab hominibus sibi relictis semper æstimata; a vere eruditis et sapientibus semper exculta; male doctis et barbaris semper inimica fuit."—LINN.

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N.B.—The figures of *Micrasterias* are half the length of the original drawings. The figures of *Euastrum* are engraved one-third less than the drawings, except *E. rostratum*, *E. spinosum* and *E. binale*, which should be reduced in the same proportion to compare them with the other species, all of which are naturally larger than these three, and the original drawings were in true proportion.

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In the plate (Pl. IV.) to illustrate Mr. Babington's paper on *Cuscuta* (p. 249) the numbers have been misplaced by the engraver. Fig. 2. is *C. approximata*, and fig. 3. is *C. Trifolii*; not as referred to in the text.

IN VOL. XIV.

Page 109, line 14, *for* "slices," *read* "series."

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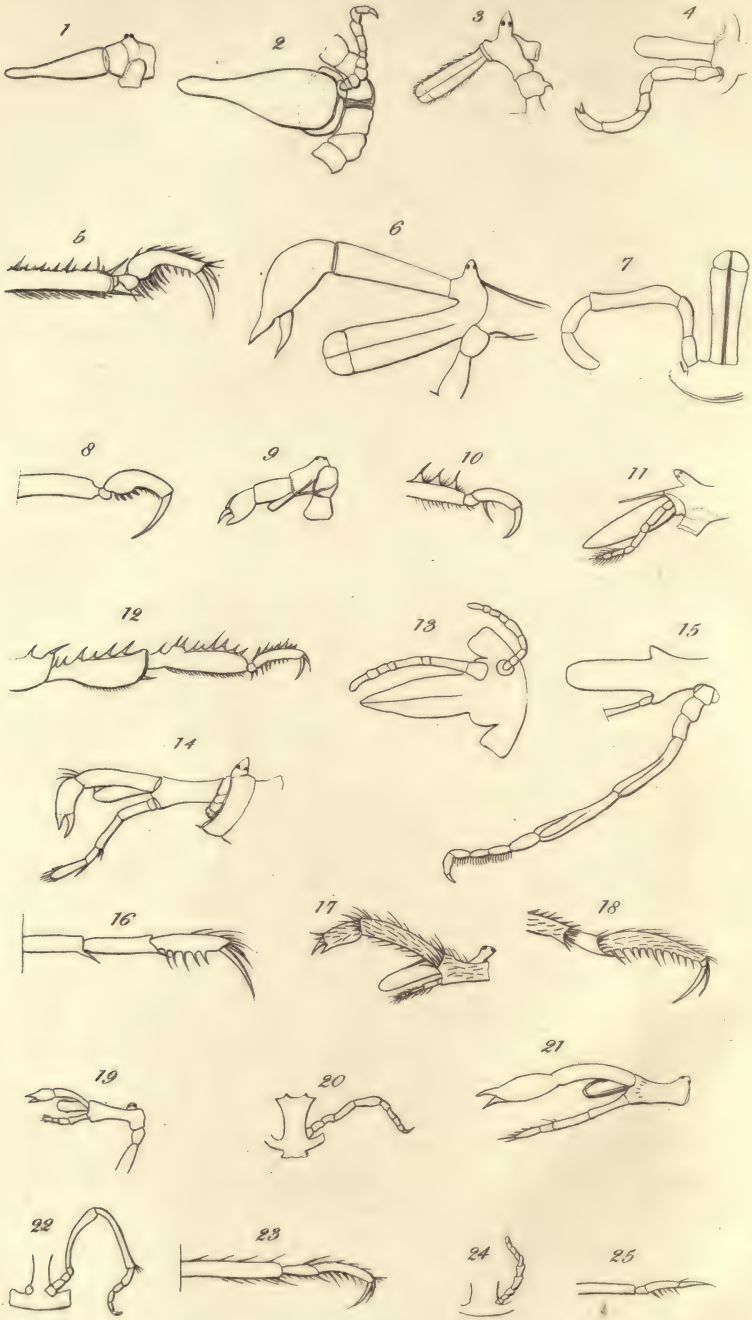
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THE ANNALS

AND

MAGAZINE OF NATURAL HISTORY.

" ..... per litora spargite muscum,
Naiades, et circùm vitreos considite fontes :
Pollice virgineo teneros hìc carpite flores :
Floribus et pictum, divæ, replete canistrum.
At vos, o Nymphæ Craterides, ite sub undas ;
Ite, recurvato variata corallia trunco
Vellite muscosis e rupibus, et mihi conchas
Ferte, Deæ pelagi, et pingui conchylia succo."
Parthenii Ecl. 1.

No. 88. JULY 1844.

I.—*On the Specific and Generic Characters of the Araneiform Crustacea.* By HARRY D. S. GOODSIR, M.W.S.

[With a Plate.]

AFTER a careful examination, the parts of the *Pycnogonidæ* which are found to afford the most decisive characters for the proper classification of the species are—the ocular tubercle, the palpi, oviferous legs, and tarsi. The first of these organs affords very valuable and sure characters, especially in the determination of the genera, but unfortunately has never been properly studied. It is therefore the object of the present communication to illustrate the characters of this organ. These animals, when examined by the naturalist, are generally lying in such a way as to hide this organ altogether. To see it properly the animal must be viewed in profile.

In *Pycnogonum* and all the other nonpalpate genera, we find the ocular tubercle standing at right angles with the segment of the thorax from which it arises, and with one exception (*Phoxichilidium*), in a line between the first pair of legs. In *Phoxichilus* the tubercle is pointed, but in all the others it is truncated.

Pycnogonum Balænarum.

This *Pycnogonum* when viewed in profile presents the appearance shown in Pl. I. fig. 1. The rostrum is flask-shaped, and the anterior extremity slightly bulging and rounded. The ocular

tubercle is situated about the middle of the first thoracic segment and is squared or truncated, bearing four small dots or eyes of a jet-black colour, which are situated in the form of a square round its superior edge.

Phoxichilus.

Phoxichilus has the ocular tubercle situated a little before the middle of the first thoracic segment; it is of considerable size, erect, and pointed at its extremity. The eyes are four in number, and are placed rather above the middle of the tubercle. The rostrum is clavate with a slight bulge before the middle; a fine line runs along its centre on each side from its base to the tip, which is crossed at right angles by another near the extremity (Pl. I. fig. 3).

The last joint of the tarsus is bent and serrate on its inferior edge (fig. 5).

The ovigerous legs of *Phoxichilus* are seven-jointed; the first, third, fourth and sixth are almost all of equal length; the second and fifth are equal (fig. 4).

Phoxichilidium coccineum.

The ocular tubercle of *Phoxichilidium* is situated on a projection which extends forwards from the first thoracic segment above the rostrum, and which likewise supports the mandibles. The ocular tubercle is conoid, truncated, with four eyes surrounding it at regular intervals, and which are situated at a little distance from the top. The rostrum is large and clavate, and with the crucial lines as in *Phoxichilus* (Pl. I. fig. 6).

The last joint of the tarsus is semilunar, with four spines arising from its basal and inferior edge (fig. 8). The oviferous legs are five-jointed, the first two and last being almost all of equal length, and the third as long as any of the other two conjoined (Pl. I. fig. 7).

In *Pallene circularis** the ocular tubercle is situated at the posterior edge of the first thoracic segment, and is very slightly raised above the surface of the segment. The eyes are situated round its superior edges (Pl. I. fig. 9).

The last tarsal joint is slightly curved, but the edges are parallel; the claw is blunted (fig. 10).

Pasithoe vesiculosa†.

By *Pasithoe* we are gradually led from the nonpalpate to the palpate genera of the order, and at the same time we find these organs in a maximum state of development. In *Pasithoe* the ocular

* Jameson's Edinb. Phil. Journ. vol. xxxii. p. 137. pl. 3. fig. 2.

† *Ib.* vol. xxxiii. p. 370. pl. 6. fig. 17.

tubercle arises from the centre of the first thoracic segment and projects forward, inclining very considerably over the rostrum; its extremity is blunted, and the eyes, which are four in number, are placed near the apex. A thin narrow projection arises from the anterior edge of the first segment immediately before the tubercle, and is continued beyond the middle of the rostrum. The palpi are eight-jointed (Pl. I. fig. 10).

*Nymphon Johnstoni**.

The ocular tubercle in *Nymphon* arises in all the species from the posterior edge of the segment. In this species it is bent from the middle backwards, at which point the eyes are situated; the apex is pointed. The palpi are four-jointed (fig. 14). The oviferous legs are eleven-jointed, including the claw (Pl. I. fig. 15). The two tarsal joints are of equal length (fig. 16).

Nymphon spinosum†.

In this species the ocular tubercle projects backwards from the base, the superior extremity is rounded, and the eyes are arranged round a projecting edge (Pl. I. fig. 17).

The first joint of the tarsus is about half the length of the second (Pl. I. fig. 18).

Nymphon pellucidum‡.

The ocular tubercle in this species is rather short, its extremity is obtuse and rounded, and the eyes are situated a little distance from the top (fig. 19).

Nymphon similis (n. s. mihi).

The ocular tubercle is depressed and projects backwards (Pl. I. fig. 21). It will be observed that this organ, in all the species of the genus *Nymphon*, is situated at the posterior extremity of the first thoracic segment, and also that it never projects forwards.

EXPLANATION OF PLATE I.

Fig. 1. Profile of the rostrum and first thoracic segment of *Pycnogonum Balænarum.*
Fig. 2. Abdominal surface of same parts with the oviferous leg of one side.
Fig. 3. Profile of *Phoxichilus.*
Fig. 4. Under or abdominal surface of same parts in *Phoxichilus.*
Fig. 5. Tarsus of *Phoxichilus* with portion of last tibial joint.
Fig. 6. Profile of *Phoxichilidium coccineum.*
Fig. 7. Abdominal surface of same parts with the oviferous leg of one side.

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* Jameson's Edinb. Phil. Journ. vol. xxxii. p. 138. pl. 3. fig. 5. Through some error, the proper references to the plate in the journal quoted have been misplaced.

† Jameson's Edinb. Phil. Journ. vol. xxxii. p. 139. pl. 3. fig. 3.

‡ *Ib.* vol. xxxii. p. 138. pl. 3. fig. 6.

Fig. 8. Tarsus of *Phoxichilidium coccineum.*
Fig. 9. Profile of *Pallene circularis.*
Fig. 10. Tarsus.
Fig. 11. Profile of *Pasithoe vesiculosa.*
Fig. 12. Tarsal and tibial joints of *Pasithoe.*
Fig. 13. Abdominal surface of rostrum and first thoracic segment of *Pasithoe.*
Fig. 14. Profile of *Nymphon Johnstoni.*
Fig. 15. Abdominal surface of rostrum and first thoracic segment of *Nymphon Johnstoni.*
Fig. 16. Tarsal joints and part of last tibial joint.
Fig. 17. Profile of *Nymphon spinosum.*
Fig. 18. Tarsal joints with portion of last tibial of *Nymphon spinosum.*
Fig. 19. Profile of *Nymphon pellucidum.*
Fig. 20. Abdominal surface of first thoracic segment with oviferous leg of one side.
Fig. 21. Profile of *Nymphon similis.*
Fig. 22. Abdominal surface with oviferous leg of one side.
Fig. 23. Tarsal joints with small portion of tibial joint.
Fig. 24. Abdominal surface of first thoracic segment with oviferous leg of one side in *Nymphon minutum.*
Fig. 25. Tarsal joints of *Nymphon minutum* with small portion of last tibial joint.

II.—*On some British species of the genus* Œnanthe. By John Ball, B.A., M.R.I.A. &c.*

The paper by Mr. Coleman (Annals, xiii. p. 188) has induced me to endeavour to throw light upon some of the doubtful species of *Œnanthe*. The *Œ. fluviatilis*, Colem., I gathered six years since near Cambridge, and also near Ely, but never having found a flowering specimen was at a loss how to denominate it. It certainly has much the appearance of a distinct species, but I do not think the characters assigned very satisfactory. I find the fruit of the ordinary *Œ. Phellandrium* to vary from elliptical to ovate, assuming quite the form figured in Mr. Coleman's plate; the upper leaf in the figure is also seen in *Œ. Phellandrium*.

I proceed to describe what I believe to be the true *Œ. pimpinelloides* of Linnæus and the continental botanists. This appears to be rare in Britain, as I have only seen specimens, wanting fruit, gathered in a dry meadow upon red marl near Forthampton, Gloucestershire, by Mr. Edwin Lees. I give the description in Latin.

Œnanthe pimpinelloides.—Radix e fibris plurimis lignosis fasciculatis inferne in napulos parvulos ovoideos incrassatis. Caulis teres, striatus, sulcatus, farctus, sesqui-tripedalis, alterne ramosus. Folia radicalia bipinnata: pinnulis inciso-dentatis trifidisve, omnibus acutis, petiolo sesqui-bipollicari basi in vaginam expanso; caulina infra pedunculum imum conformia pinnulis angustioribus; se-

* Read before the Botanical Society of Edinburgh, 11th April 1844.

quentia pedunculos elongatos rigidos amplectentia vagina petiolari successive breviori, pinnata pinnulis linearibus tripartitis simplicibusve, inferioribus valde elongatis; suprema caulis et pedunculorum linearia elongata. *Pinnulæ foliorum omnium margine cartilagineo minute denticulato in mucronem producto.* Umbellæ solitariæ, terminales, 6—15-radiatæ, convexæ; accessoriæ primarium æquantes aut superantes. Involucrum universale nunc nullum, nunc 1—6-phyllum; foliis setaceis, inæqualibus, umbella multo brevioribus. Umbellulæ multifloræ, densæ; floribus externis sæpe sterilibus longius pedicellatis, internis subsessilibus. Involucella polyphylla; foliolis lineari-lanceolatis, acuminatis, inæqualibus, pedicellos florigeros exteriores subæquantibus. Petala inæqualia, præsertim florarum sterilium, lata, obcordata, ad medium fissa, alba nervis coloratis: segmenta marginis calycini liberi lato-lanceolata, inæqualia, duo exteriora longiora. Diachenium.....

An *Œnanthe* gathered in the island of Ischia, which seems to be the *Œ. pimpinelloides* of Bertoloni (Fl. Ital. iii. 236), differs in having the pinnules of all the stem-leaves linear, the sheaths longer, and sometimes wants the sterile external florets. The diachenium is of nearly equal thickness throughout, crowned with the erect persistent calyx, and somewhat longer than the stiff, slightly diverging styles; the very short adpressed pedicels forming a callous ring at the base. I have this form also from near Pisa.

What principally distinguishes this plant is the mucronate pinnules of all the leaves; besides which it differs from *Œ. Lachenalii* in the fruit and the involucella, and from *Œ. silaifolia* and *Œ. peucedanifolia* in many obvious points. *Œ. Jordani*, Ten., which I have gathered near Pæstum, differs mainly by the very crowded umbel, and the longer sheathing petioles. I do not find all the leaves bipinnate, as Bertoloni describes them, the upper-stem leaves being pinnate with very long linear segments, and ultimately simple linear elongate; my plant, so far, looking like an intermediate variety.

I have no doubt as to the identity of the Gloucestershire plant with the foreign ones above mentioned, and the Toulouse specimen referred to by Mr. Babington (Man. Br. Bot. 130) seems to agree with my description, so that *Œ. pimpinelloides* must resume its place in the flora of Britain.

I next come to the *Œ. peucedanifolia* of Smith, Hooker, Babington, and all British botanists, but not of Pollich, or the principal foreign writers. I agree with Bertoloni in confirming the opinion of Bieberstein (Fl. Tauro-Caucas. iii. 232), that his *Œ. silaifolia* is the *Œ. peucedanifolia* of Smith (Eng. Bot. t. 348). I found this plant in a salt-marsh near Portmarnoch, county Dublin, Ireland, and have received it from the banks of the

Severn at Deerhurst, Gloucestershire, where it was gathered by Mr. E. Lees. The following description will establish the identity:—

Œnanthe silaifolia.—Radix e napulis oblongis clavatis fasciculatis in fibrillam desinentibus. Caulis teres, striatus, fistulosus, alterne ramosus, 1—2-pedalis. Folia radicalia .....; cætera omnia subconformia, bipinnata; foliolis fere æqualibus; pinnulis acutis, integerrimis, inferiorum lanceolatis, superiorum linearibus; folia suprema pinnata. Petioli inferiores elongati basi vaginantes, superiores omnes breves 1—2-pollicares. Umbellæ solitariæ, 5—8-radiatæ, primaria (in speciminibus nostris) subsessilis, accessoriæ ramorum terminales longiuscule pedunculatæ. Involucrum universale nullum seu foliolis 1—7, setaceis, umbellam sub mediam longis. Umbellulæ multifloræ, densæ, floribus externis longius pedicellatis, sæpe (semper?) sterilibus; internis subsessilibus. Involucella e foliolis plurimis, latiusculis, albo-marginatis, nonnullis basi connatis, umbellula florigera exigua paulo brevior. Marginis calycini liberi segmenta præ corollam magna, lanceolata, tria exteriora longiora. Petala minuta, parum inæqualia, late obcordata, ad tertium fissa. Styli divergentes. Stylopodium majusculum, conicum. Diachenium (haud omnino maturum) exiguum, clavatum (ad basin ut videtur haud incrassatum), inferne quidquam contractum.

Comparing the description of Bieberstein, referred to above, with those of Koch and Bertoloni, there can be but little doubt that this plant is the *Œ. silaifolia* of those writers. The two latter authors differ in one respect, Koch describing the fruit as cylindrical and "basi callo cinctis," as noticed by Babington; it is probable however that the same plant is intended by both these distinguished writers. This species, which differs from all its allies by the similarity of structure in all the leaves and the shorter and uniform leaflets, is further distinguished from the true *Œ. peucedanifolia* by its very much smaller petals and fruit, and from *Œ. Lachenalii* by the structure of the root.

By far the most common species of this group is the *Œ. Lachenalii* of Babington, and apparently the plant of Gmelin, Koch, DeCandolle and Bertoloni. I may premise that there is some difference in the various descriptions of the root, upon which, owing to the general neglect of this portion of most plants amongst British botanists, my specimens do not allow me to give an opinion. The exact Bertoloni says, "fibris inferne incrassatis in napulos cylindraceo-clavatis fibrilla terminatis," whilst Koch and Babington seem to intend fibres thickened and tuberous from the top. I have specimens of this plant from several parts of England, from the coast of Galloway and from near Dunbar in Scotland. I do not find the difference which Mr. Babington

suspects between the fresh and salt water forms*. The following is the description:—

Œnanthe Lachenalii.—Radix... Caulis erectus, striatus, fistulosus seu subfarctus, alternè ramosus, 1—3-pedalis. Folia radicalia pinnata, pinnis pinnatifidis trifidisve inæqualibus, segmentis obverse lanceolatis obtusis venosis, petioli mediocris longitudinis basi vaginante; caulina pinnata longe petiolata pinnis trifidis segmentis linearibus acutis valde elongatis; successiva minora, demum simplicia, segmentis semper inæqualia. Umbellæ solitariæ, terminales, 5—15-radiatæ, longe pedunculatæ. Involucrum universale 0, seu 1—6-phyllum, foliolis linearibus acutis, umbella multo brevioribus. Umbellulæ multifloræ, floribus externis sterilibus longius pedicellatis, internis subsessilibus in fructu fastigiatæ. Involucella umbellula brevior e foliolis lanceolatis margine pallentibus nonnullis basi connatis. Petala radiantia quam in *Œ. silaifolia* paululum majora profundius obcordata. Styli diachenio breviores, parum divergentes. Stylopodium majusculum, conicum. Diachenium basi non calloso semper angustatum, variat tamen magnitudine et forma; interdum majus usque ad summum dilatatum quasi obconicum, interdum (præ siccitate ut videtur) minus, sub calyce (diviso in segmenta erecta inæqualia) constrictum.

In foreign specimens from the Bolognese Apennines, the fruit is more exactly as described by Koch. The form of the lower leaves is very constant in all the forms of this otherwise variable species. The variation in the form of the fruit is very singular, but with the specimens before me I cannot refuse to believe it.

A word as to the value of the characters of these species. The position and size of the tubers of the root are, I suspect, of doubtful constancy; observation must determine their importance. The general disposition and proportions of the leaves are probably much to be depended upon here and throughout the whole order. The hollowness or solidity of the stem depends, I believe, almost wholly on the place of growth, and is of no moment. The involucre is most variable. The petals vary somewhat in size but scarcely in form, those of the outer sterile floret being always compared with each other. The form of the fruit seems not so constant as might be expected. The presence or absence of the incrassated summit of the pedicel I have never seen to vary.

I need scarcely add, that the above descriptions are taken exclusively from the British specimens referred to.

Dublin, March 10, 1844.

* No difference exists between them.—C. C. Babington.

III.—*Descriptions of new species of* Melania *collected during the Voyage of H.M.S. Sulphur.* By Richard Brinsley Hinds, Esq.

1. *Melania fumosa.* Testa elongata, crassiuscula, lævigata, olivaceo-fusca, unicolore, vel junioribus infra suturam strigis longitudinalibus rufis ornata; anfractibus paulisper rotundatis, superne late subconcave coarctatis, lineis impressis sparsim et obsolete cinctis; spira erosa apud anfractum quartum; apertura cærulescente. Axis truncatus 29 lin.

   Hab. New Ireland; in the streams about Port Carteret.

2. *Melania aspirans.* Testa elongate subulata, lævigata, fusca, unicolore; anfractibus numerosis, subplanulatis, lineis arcuatis incrementi fere minute pliciformibus, ultimo ad basin striato; sutura lineis impressis comitata; apertura cærulescente; columella albida. Axis 23 lin.

   Hab. Feejee Islands; in the rivers.

3. *Melania Plutonis.* Testa pyramidato-subulata, subturrita, lævigata, nitida, aterrima, unicolore; anfractibus paulisper rotundatis, ultimo magno, rotundato; apertura cærulescente. Axis 23 lin.

   Hab. Feejee Islands; in the rivers.

Very pyramidal in its shape, and the last whorl displays a far greater proportion than is usual; otherwise its characters are perfectly passive. The apex is erose to the fifth or six whorl.

4. *Melania figurata.* Testa elongate subulata, lævigata, polita, fulva; anfractibus numerosis subrotundatis, superne strigis rufis longitudinalibus, infra lineis interruptis transversis seriatim dispositis ornatis, infra suturam pliciferis, ultimo ad basin striato; apice eroso; apertura cærulescente. Axis 22 lin.

   Hab. New Ireland; in the streams.

The ornation of this species is eminently distinguishing; otherwise it is a smooth, elongated, tawny shell, like many others. The middle and inferior portions of each whorl are adorned with transverse rufous interrupted lines, disposed in regular series round the shell, and present a pretty appearance on its pale yellow semitransparent surface.

5. *Melania picta.* Testa elongate subulata, fusca; anfractibus numerosis, subplanulatis, plicatis, transversim sulcatis, strigis rufis longitudinalibus ornatis, infra suturam uniseriatim tuberculatis; apertura cærulescente. Axis 19 lin.

   Hab. New Ireland; in the streams.

This species closely resembles *M. subulata* of Sowerby's 'Genera,' not of Lamarck; the figure there given does not represent some of the characters dwelt on in the above description, and I am not aware that a diagnosis anywhere exists.

6. *Melania luctuosa*. Testa subulata, turrita, fusca ; anfractibus planulatis, fere subconcavis, transversim lineis impressis cinctis, strigis rufis longitudinalibus interruptis ornatis ; spira paulisper erosa ; apertura cærulescente. Axis 13 lin.

Hab. Feejee Islands ; in the rivers.

So contracted are the whorls here as in some cases to be not only flattened but even concave, particularly towards the last whorl.

7. *Melania perpinguis*. Testa elongata, fusca, strigis rufis longitudinalibus plerumque ornata ; anfractibus rotundatis, subturritis, lineis transversis impressis exculptis ; spira subplicata, apud extremitatem erosa ; apertura cærulescente, ad peripheriam ustulata. Axis 14 lin.

Hab. Feejee Islands ; in the rivers.

8. *Melania occata*. Testa ovata, elongata, lutescente ; anfractibus paucis, rotundatis, exaratis, lyris intermediis angustis acutis ; spira apud anfractum quartum erosa ; apertura cærulescente. Axis 12 lin.

Hab. River Sacramento, California.

The rounded whorls are ploughed into numerous furrows, and the intervening ridges are comparatively narrow and keel-shaped ; the lower part of the aperture is somewhat dilated, and slightly disposed to elongate in the manner of *Io*.

9. *Melania mœsta*. Testa ovata, elongata, fuliginea, infra epidermidem albida ; anfractibus rotundatis, superne angulatis et excavatis, transversim lineis impressis striatis ; spira apud extremitatem erosa ; apertura ustulata, ad basin subtruncata. Axis 15 lin.

Hab. Feejee Islands ; in the rivers.

The slightly concave area of the whorl beneath the suture, which occurs in this species, is shared with a few others. In the present, it influences the shape of the aperture, straightens the outer lip, provides it with an angle above, and truncates it below. The margins of the aperture have the colour of burnt umber.

10. *Melania verrucosa*. Testa subulata, subturrita, lutea ; anfractibus octonis planulatis, longitrorsum obtuse plicatis, lineis tribus transversis intersectis, harum intervallis obtusis, quadratis, tuberculosis ; apice vix eroso ; apertura elongata, lutescente. Axis 10 lin.

Hab. New Ireland ; in the streams.

11. *Melania fulgurans*. Testa obeso-subulata, lævigata, polita, lutescente, strigis rufis angulatis fulmen simulantibus conferta ; anfractibus decenis subrotundatis ; spira læviter plicata, exserta, vix erosa ; apertura ovali, cærulescente. Axis 13 lin.

Hab. New Ireland ; in the streams.

Few species of *Melania* have the pretensions to beauty of this.

The shell is subulate, with the inferior whorls obese, smooth and polished; the whorls about ten in number and slightly rounded; those towards the apex indistinctly plicated; spire exserted and scarcely eroded. The base colour is a pale yellow, densely crowded with transverse angular dark red markings.

12. *Melania florata.* Testa ovato-elongata, polita, cornea, tessellata; anfractibus paucis, subrotundatis, seriebus tribus macularum rufarum quadratarum eleganter ornatis; serie suprema præcipue maxima, intermedia minima; anfractu ultimo ad basin punctato; spira erosa; apertura cornea. Axis $6\frac{1}{2}$ lin.

Hab. New Ireland; in the streams.

This also is a pretty species with a pale surface, each whorl being ornamented by three series of transverse reddish spots, of which the superior is the largest and most deeply coloured; the two others are punctations of reddish spots, the inferior being intermediate in size. Very delicate striæ, not easily recognizable, traverse the shell transversely.

13. *Melania gaudiosa.* Testa ovato-elongata, lævigata, polita, cornea; anfractibus octonis subplanulatis, unicoloribus; spira oblique plicata, ad extremitatem erosa; apertura ovali, cornea. Axis 9 lin.

Hab. New Ireland; in the streams.

Approaches somewhat closely, in general character, the American shell, *M. plicifera.*

14. *Melania pyramidata.* Testa elongate subulata, gracili, nitida, cornea; anfractibus decem subplanulatis, transversim distanter striatis, superne intra suturam fusco anguste fasciato, ultimo ad basin puncticulato; spira versus extremitatem plicata, erosa; apertura ovali. Axis 9 lin.

Hab. New Ireland; in the streams.

15. *Melania latebrosa.* Testa ovata, elongata, sordide fusca; anfractibus perpaucis, rotundatis, lineis impressis transversis instructis, erosis usque ad penultimum; apertura parva, ovali, cærulescente. Axis 8 lin.

Hab. New Ireland; in the streams.

A small obese shell, with little to distinguish it beyond its few rounded whorls furrowed transversely with parallel impressed lines, and its comparatively small, neat, oval aperture.

16. *Melania pugilis.* Testa spinosa, elongate ovata, fulva; anfractibus circa novem, rotundatis, superne spiniferis, infra suturam serie unica macularum rufarum, inferne seriebus duabus minoribus cinctis, ultimo ad basin multiseriato, spinis distantibus, ad peripheriam quinque, truncatis, linea angulata alligatis; spira subtruncata; apertura oblique ovali, subattenuata, albida. Axis 14 lin.

Hab. New Ireland; in the streams.

Shell ovate, pale yellow; whorls ventricose, spiniferous, of an uniform colour in the middle, above adorned with a single series of red markings, longitudinal or nearly square, below with two series of smaller spots placed on bands slightly paler than the neighbouring shell; the last whorl exhibits at its base several series of these articulated bands; the spines are distant and truncated to near their base; about five occupy the circumference of a whorl, and an angular line connects each with its neighbours; the spire has scarcely lost more than its extreme whorl by erosion; and the aperture is white, and in a slight degree attenuated at its base.

17. *Melania bellicosa.* Testa spinosa, ovata, valde truncata, fusca; anfractibus tribus rotundatis, transversim striatis, spiniferis, frequenter erosis; spinis aculeiformibus, subrectis, ad basin decurrentibus; spira apud anfractum antepenultimum truncata; apertura elongate ovali, subfusca. Axis 9 lin.

Hab. Feejee Islands; in the rivers.

Nearly allied to *M. spinulosa,* Lamarck, which is found in the rivers of Timor.

IV. — *Contributions to British* Jungermanniæ. By Thomas Taylor, M.D., F.L.S. &c.*

1. Jungermannia nimbosa, *Tayl. MSS.* Caule laxe cæspitoso, erecto, subramoso; foliis laxis subsquarrosis; lobo *inferiori* obovato, subacuto, patenti, *superiori* minori, obovato, erectiusculo, subimbricato, cauli adpresso, utrisque margine ciliatis, subconnexis.

On the summit of Brandon mountain, county of Kerry, 1813.

Stems growing up through tufts of *Musci,* reddish brown, 2—4 inches long; leaves, except at the very base, nearly of the same size; the lower lobe patent or deflexed, and so the shoots have a squarrose appearance: their texture is of very minute cells, their *ciliæ* distant and large; the connexion between the upper and lower lobes is very short.

This was taken for *Jung. nemorosa,* L., when first brought down from Brandon Hill. It differs, however, by the taller size, the more deflexed lower lobes of the leaves, the slight joining between their lobes, and by the more considerable and more distant *ciliæ* of their margins.

From *Jung. planifolia,* Hook., which accompanied it, the present is known by the more squarrose leaves, the stronger ciliation of their margins, the more considerable connexion between the lobes, and the more concave and less imbricated leaves. The calyx

* Read before the Botanical Society of Edinburgh, 9th May 1844.

has not been seen, nor indeed has the plant been found again by the numerous acute observers that have ascended its native mountain.

2. Jungermannia curta, *Martius*. Caule subcæspitoso, abbreviato, adscendente; foliis inferioribus multo minoribus, subimbricatis, apice dentatis; lobo *inferiori* obovato, planiusculo, *superiori* minori, acuto, inferiorum subquadrato.

Scapania curta, Nees, Lindenberg et Gottsche, Synopsis Hepaticarum, p. 69; Hooker's Brit. Jung. t. 21. figs. 17, 18 and 19.

So variable is this species, that in the 'Synopsis' no less than nine varieties are distinguished. This will account, in some degree, for the late period of recognizing this species in Britain. In Ireland it occurs in a great variety of situations, on stones on mountain sides facing the north; but its most favourite locality is in old woods on damp rocks, as at Cromaglown near Killarney. The size is so variable, that some states closely resemble *Jung. nemorosa*, L., a species, perhaps, the most difficult to understand of any of the genus.

3. Jungermannia Thuja, *Dicks*. Caule cæspitoso, adscendente, subpinnatim ramoso, supra convexo, glabro; foliis arcte imbricatis, lobo *inferiori* patenti, oblongo, recurvo, integerrimo, *inferiori* ovato, obtusiusculo, margine reflexo; stipulis oblongis, acutis, integerrimis, margine reflexis, apice recurvis; perichætii lateralis, emergentis foliis majoribus ciliato-serratis.

On stones; side of Lough Finnehy, near Dunkerron, co. of Kerry.

Tufts wide, olive-green, the older parts purplish brown, shining, the shoots acuminated. In plants with *perichætia* the branches are very short. Mr. Dickson long since found this plant on the sides of mountain lakes in Scotland, and very properly judged it to be distinct from *Jung. platyphylla*, L. He gave, however, no diagnosis, whence the two have been confounded by all subsequent writers.

It may be known by its greater size, its shining surface, its acuminate shoots, its denser structure, its *perichætia* prominent beyond the cauline leaves, its perichætial leaves larger, wider, more divergent, and always ciliato-serrate, its divisions less regularly pinnate, the closer imbrication of the leaves, and the more patent position of their inferior lobes.

4. Jungermannia rivularis, *Nees*. Caule cæspitoso, subpinnatim ramoso, adscendente; foliis approximatis, patentibus, lobo *superiori* ovato-rotundato, plano, *inferiori* minuto, ovato, obtuso, utroque integerrimo: stipulis minutis obovatis integerrimis.

On stones in streams at Dunkerron, co. of Kerry.

Tufts wide, loose, dark green, the younger shoots of a lively

green. Stems 1—2 inches long, irregularly branched, scarcely pinnate, branches short, patent. Leaves oblongo-rotundate, sometimes a little narrower at the top, quite entire; their structure densely and minutely cellular. The lower lobe is more minute in proportion to the upper than in any of the congeners: the stipules are scarcely wider than the stems.

Through the kindness of Dr. Gottsche, who sent me specimens from Hercynia, I have been enabled to identify this species, which I had long considered something more than a variety of *Jung. platyphylla*, L. The fructification I have not seen.

5. Jungermannia Dillenii, *Tayl. MSS.* Caule cæspitoso, erecto, apice incurvo, subramoso; foliis imbricatis, semiverticalibus, erecto-patentibus, secundis, obovatis, dentatis, margine utroque recurvo, basi decurrentibus; calycibus ex angusta elongata basi oblongis, compressis, ore truncatis, crenatis, segmentis dentatis.
Lichenastrum, no. 6, Dillenii Muscologia, p. 483. t. 69. f. 6. A, B, C.

On sandy banks of streams in woods, at Gortagaree and Blackwater, co. of Kerry.

Tufts wide, dark green. Stems about an inch high, sparingly branched, curved at the top. Leaves convex towards the anterior margin.

Dillenius distinguished the present from *Jung. asplenioides*, L.; they have been confounded by all succeeding writers. This species may be recognized by the obovate leaves, which have no appearance of being truncate at their tops; by their being more crowded, nearly vertical, dentate throughout; by both their margins being recurved, and hence appearing convex in front; by their less patent position, by the greater length of their decurrent bases, very essentially by their smaller cellules; and by the mouth of the calyx having large crenulations, which are themselves denticulate. Besides, the tufts are of a darker green, and the shoots more slender.

6. Jungermannia Aquilegia, *Tayl. MSS.* Caule cæspitoso, prostrato, subpinnato; ramis complanatis; foliis imbricatis, erectiusculis, convexis, integerrimis, lobo *superiori* obovato-rotundato margine recurvo; *inferiori* minori subquadrato ex tumida involuta basi apice adpresso; perichætialibus oblongis transversalibus deflexis; calycibus elongate obconicis truncatis integerrimis.
Jung. complanata, β minor, Hook. Brit. Jung. t. 81. f. 17.

On rocks over which water continually trickles.

Patches wide, shallow, brownish olive. Stems 1—4 inches long, irregularly pinnate; the branches nearly at right angles to the stem. Leaves from a narrow base, flatly cup-shaped; their lower lobe swelling out at its involution, while their angulate tops lie closely adpressed to the inside of the upper lobe.

This species differs from *Jung. complanata*, L., by the smaller and more convex leaves, their olive-brown colour, their lesser lobe not sharply reflected upon the upper but having a tumid base, by the deflexed perichætial leaves, by the *perigonia* occurring usually at the termination of the shoot and not on proper short lateral branches, and by the angulate portion of the lower lobes of the leaves being shorter. This species prefers very wet surfaces of mural rocks, while *Jung. complanata*, L., is partial to trees.

V.—*Descriptions of some* Chalcidites *of North America, collected by* George Barnston, Esq. By Francis Walker, Esq., F.L.S.

The two hemispheres of the earth are said to be represented in their climate and productions by the higher mountains, whose tops are compared to the poles, and the plains whence they arise to the equatorial line. The vegetation and animals on one side of a mountain range are often very different from those of the other side, while on its summit they are alike. Thus also in proportion as we are more remote from the poles and nearer to the tropics, we find creatures more numerous and more various, due allowance being made for the soil, elevation, size and form of the land. In entomology, the land within the Arctic circle comprises one insect region, and of the territories surrounding it have been formed three regions, that of North America, that of Europe, and that of Siberia. The insects here described were taken at Martin's Falls, Albany River, Hudson's Bay*, which is contained in the North American region. I am indebted to G. Barnston, Esq., for this opportunity of adding to the knowledge of the geography of the *Chalcidites*.

Callimome splendidus, *Barnston's MSS.* fem. *Viridis cupreo varius, abdomine purpureo, antennis nigris, pedibus rufis, alis subfulvis.* (Corp. long. lin. 2; alar. lin. 3.)

Body convex, thinly clothed with hairs: head and thorax minutely squameous; the scales on the head and on the fore part of the thorax so disposed as to form little transverse undulations: head green, æneous in front, as broad as the thorax: eyes and ocelli red: mandibles fulvous: antennæ black, clavate, pubescent, shorter than the thorax; first joint fulvous, long, slender; second long-cyathiform; third and fourth very minute; fifth and following joints to the eleventh successively shorter and broader; club linear, conical at the tip, more than twice the length of the eleventh joint: thorax elliptical, green: prothorax transverse, forming beneath in front a slender neck which joins the head, its breadth more than twice its length: scutum of the

* See "Observations on the progress of the seasons as affecting animals and vegetables at Martin's Falls, Albany River, Hudson's Bay," by G. Barnston, Esq., in the Edinburgh New Philosophical Journal, vol. xxx. 1840–41.

mesothorax long; sutures of the parapsides distinct, approaching each other; axillæ large, triangular, not conniving; scutellum nearly rhomboidal: metathorax cupreous, transverse, very short: propodeon cupreous, large, subquadrate, almost horizontal, having a few little ridges along the middle: podeon extremely short: abdomen elliptical, purple, very minutely squameous, varied with green on each side, nearly as long and as broad as the thorax; metapodeon occupying more than one-third of the dorsum, slightly dehiscent on the middle of the hind border, having a little channel at the base; octoon a little shorter than the metapodeon; ennaton much shorter than the octoon; decaton still shorter; protelum, paratelum and telum very short: segments of the thorax beneath partly cupreous, very minutely squameous, having a suture along the middle: ventral segments of the abdomen concealed by those of the dorsum: sheaths of the oviduct black, pubescent, a little longer than the abdomen: legs pale red; coxæ green, scaly: wings slightly tinged with yellow; nervures fulvous; humerus much less than half the length of the wing; ulna much shorter than the humerus; radius much shorter than one-fourth of the length of the ulna; cubitus not half the length of the radius; stigma of moderate size, emitting a thick branch towards the tip of the radius.

Callimome Cecidomyæ, fem. *Aureo-viridis, antennis nigris, pedibus flavis viridi et fusco vittatis, alis limpidis.* (Corp. long. lin. $1\frac{1}{4}$; alar. lin. 2.)

Body bright golden-green, convex: head and thorax finely squameous, the scales on the head and on the fore part of the thorax so disposed as to form little transverse undulations: head as broad as the thorax: antennæ black, subclavate, pubescent, shorter than the thorax; first joint long, slender, green, fulvous at the base; second cyathiform; third and fourth very minute; fifth and following joints to the eleventh successively but very slightly shorter and broader; club linear, conical at the tip, a little broader than the eleventh joint and more than twice its length: thorax elliptical: prothorax transverse, narrower in front, its breadth more than twice its length: scutum of the mesothorax long; sutures of the parapsides distinct, approaching each other; axillæ large, triangular, not conniving; scutellum somewhat rhomboidal: metathorax transverse, very short: propodeon transverse, rather short, very slightly decumbent: podeon extremely short: abdomen fusiform, smooth, shining, narrower, but not longer than the thorax, blue towards the base; the segments, excepting the metapodeon, very minutely squameous; metapodeon occupying less than one-third of the dorsum, slightly dehiscent on the middle of the hind border; octoon and ennaton of moderate length; decaton longer than the ennaton; protelum shorter than the ennaton; paratelum still shorter; telum very short: sheaths of the oviduct black, pubescent, much longer than the abdomen: legs yellow; coxæ green; a longitudinal stripe of green on each of the metafemora, and the same of fuscous on each metatibia; mesotarsi and metatarsi straw-colour, fuscous at the tips: wings limpid, broad,

very long, reaching when at rest to half the length of the sheaths of the oviduct; nervures piceous; humerus much less than half the length of the wing; ulna much shorter than the humerus; radius hardly longer than one-sixth of the ulna; cubitus half the length of the radius; stigma small, emitting a very short branch.

Parasitic on *Cecidomya communis*, Barnston's MSS.

Lamprotatus Diæus, fem. *Æneus, antennis nigris, pedibus rufis, femoribus viridibus, alis limpidis.* (Corp. long. lin. 1; alar. lin. $1\frac{3}{4}$.)

Body convex, æneous: head and thorax finely squameous: head transverse, short, a little broader than the thorax: antennæ black, subclavate, a little shorter than the thorax; first joint long, slender, æneous; second cyathiform, æneous; third and fourth joints very minute; fifth and following joints to the tenth transverse, successively shorter and slightly increasing in breadth; club conical, more than twice the length of the tenth joint: thorax elliptical: prothorax transverse, very short, rounded in front, much narrower than the mesothorax: scutum of the mesothorax broad; sutures of the parapsides very distinct, approaching each other; axillæ large, triangular, not conniving; scutellum narrow, somewhat rhomboidal: metathorax transverse, very short: propodeon transverse, obconic, decumbent: podeon very short: abdomen elliptical, slightly keeled beneath, a little narrower but not longer than the thorax; metapodeon occupying less than one-third of the dorsum; octoon not half the length of the metapodeon; ennaton shorter than the octoon; decaton a little longer than the ennaton; protelum and paratelum each as long as the decaton; telum very short; ventral segments hidden by those of the dorsum: oviduct concealed: legs dull red; coxæ æneous; thighs æneous green; mesotarsi and metatarsi pale red, their tips fuscous: wings limpid; nervures fuscous; humerus much less than half the length of the wing; ulna not more than half the length of the humerus; radius longer than the ulna; cubitus much shorter than the ulna; stigma small, emitting a short branch.

Pteromalus puparum, *Linn.* &c.

Female.—Scales of the scutellum more minute than those of the scutum of the metathorax: propodeon having a rim on each side: abdomen oval, concave above, pilose towards the tip; metapodeon smooth, occupying more than one-third of the dorsum; octoon of moderate size, very minutely squameous, as are all the following segments; ennaton shorter than the octoon; decaton shorter than the ennaton; protelum, paratelum and telum of equal length, each a little longer than the decaton; dorsal segments hiding those beneath the abdomen, leaving a passage for the oviduct.

Reared from the pupa of *Vanessa Cardui* by Mr. Barnston. This insect inhabits Europe, and has been found in Finmark, within the Arctic circle. It is a means ordained by Providence to counteract the otherwise too great increase of butterflies belonging to the genera *Pontia* and *Vanessa*.

Encyrtus Bolus, fem. *Ater, antennis pedibusque nigris, genubus fulvis, tarsis piceis, alis albis.* (Corp. long. lin. $\frac{1}{2}$; alar. lin. $\frac{3}{4}$.)

Body black, convex, shining, slightly punctured: head transverse, short, vertical, as broad as the thorax: antennæ clavate, black, as long as the thorax; first joint long, stout; second cyathiform; third and following joints to the ninth small, successively shorter and broader; club fusiform, nearly as long as all the joints from the third to the ninth: thorax elliptical: prothorax transverse, extremely short, not visible above: scutum of the mesothorax large, having a slight channel along its disc; parapsides united with the scutum; axillæ triangular; scutellum small: metathorax transverse, very short: propodeon obconic, declining: podeon extremely short: abdomen fusiform, concave above, longer and narrower than the thorax: legs black; knees fulvous; tarsi piceous; middle legs having the tibiæ and tarsi long and large as usual: wings white, rather small; nervures fuscous; humerus less than half the length of the wing; ulna thick, very short; radius still shorter than the ulna; cubitus much longer than the ulna; stigma small, emitting no branch.

Reared from a species of *Coccus*? that infests willow-twigs.

Tetrastichus granulatus, fem., *Barnston's MSS.* Tetrastichus Agathocles? A. N. H. 1. *Æneo-viridis, antennis fuscis, pedibus flavis, femoribus viridibus, tibiis nonnunquam fuscis, alis limpidis.* (Corp. long. lin. $\frac{1}{2}$—$\frac{2}{3}$; alar. lin. 1—$1\frac{1}{4}$.)

Body æneous-green, shining, slightly convex, very minutely squameous, thinly pubescent: head very short, impressed between the eyes, as broad as the thorax: eyes and ocelli red, one of the latter in advance on a line between the other two: antennæ fuscous, clavate, pubescent, shorter than the thorax; first joint long, slender; second cyathiform; fourth joint shorter and broader than the third, but longer and narrower than the fifth; club elliptic, broader than the fifth joint and about twice its length: thorax elliptical: prothorax transverse, very short: scutum of the mesothorax very large, having a slight furrow along the middle; sutures of the parapsides very distinct, approaching each other; axillæ rather large, not conniving; scutellum somewhat rhomboidal, having a longitudinal furrow on each side: metathorax transverse, very short: propodeon transverse, rather short, slightly decumbent: podeon extremely short: abdomen oval, depressed, shorter and a little broader than the thorax; metapodeon large; octoon and following segments to the telum successively shorter?: oviduct concealed: legs yellow; coxæ and thighs green; tibiæ sometimes fuscous; tips of the tarsi fuscous: wings limpid; nervures fulvous, not much more than half the length of the wing; humerus rather short; ulna as long as the humerus; radius extremely short; cubitus long, rather less than half the length of the ulna but more than twice the length of the radius; stigma very small, emitting a short branch.

VI.—*Descriptions of some British* Chalcidites. By Francis Walker, Esq., F.L.S.

Eurytoma tumida, mas et fem. *Atra, brevis, gibbosa, alta, antennis pedibusque nigris, genubus tarsisque rufis, alis limpidis, nervis piceis.* (Corp. long. lin. 1; alar. lin. $1\frac{3}{4}$.)

Male.—Body convex: head and thorax roughly punctured: head a little broader than the thorax: antennæ setaceous, nodose, verticillate-pilose, as long as the thorax; first joint long, slender; second cyathiform; third and fourth very minute; fifth and following joints hardly dilated, appearing more approximate than in the following species, *verticillata, Serratulæ, curta, Abrotani, apicalis, collaris, annulipes, atra* and *Argele*: thorax somewhat obconic: prothorax a little narrower than the head, quadrate; its breadth rather more than twice its length: mesothorax more convex than that of the following species, *verticillata, Serratulæ, curta, annulipes, rufipes, Scultenna* and *Sittace*; scutum large, broader than long; sutures of the parapsides very distinct, approaching each other; axillæ or paraptera large, triangular, separated above by a space nearly equal to the scutum between the base of the parapsides; scutellum somewhat conical, truncate in front, abruptly decumbent behind, and thus forming nearly a right angle: metathorax very short, appearing transversely after the hind border of the scutum: propodeon (usually termed metathorax) large, obconic, furrowed distinctly along the middle, but less clearly on each side, more abruptly decumbent than in the following species, *verticillata, Serratulæ, curta, Abrotani, annulipes, rufipes, Scultenna* and *Sittace*: podeon slender, cylindrical, punctured, as long as the propodeon: abdomen short-oval, smooth, shining, much compressed, hardly longer than high, subtriangular when viewed sideways (being flat beneath and forming above an angle whose sides are convex), shorter than that of *verticillata, Serratulæ* and *curta*; metapodeon large, having no channel; octoon, ennaton and decaton of moderate size; protelum, paratelum and telum very short: wings broad; humerus slender, much less than half the length of the wing; ulna thick, much less than half the length of the humerus; radius much shorter than the ulna; cubitus as long as the radius; stigma small, emitting a short branch.

Female.—Head as broad as the thorax: antennæ shorter than the thorax, thicker, shorter and more clavate than in the following species, *verticillata, Serratulæ, curta, annulipes, rufipes, Sittace* and *Argele*; fifth and following joints to the ninth long, successively decreasing in length; club fusiform, twice the length of the ninth joint: podeon much shorter than the propodeon: abdomen much longer than that of the male, shorter than that of *verticillata, Serratulæ* and *collaris*, fusiform, convex and keeled beneath, slightly compressed, its length considerably exceeding its height; segments from the metapodeon to the decaton large above, much contracted on each side, approximate and conniving together beneath; metapodeon of moderate size; octoon, ennaton and decaton large; protelum very short above, much dilated on each side and concealing the ventral segments; paratelum and telum very short above but broader on each side.

Eurytoma Argele, mas et fem. *Atra, convexa, vix gibbosa, antennis pedibusque nigris, genubus tarsis protibiisque rufis, alis limpidis, nervis fuscis.* (Corp. long. lin. $1\frac{1}{2}$; alar. lin. $2\frac{1}{2}$.)

Male.—Body convex: head and thorax roughly punctured: head a little broader than the thorax: antennæ setaceous, nodose, verticillate-pilose, as long as the thorax; first joint long, slender; second cyathiform; third and fourth very minute; fifth and following joints subquadrate, dilated, successively decreasing in size, each having a narrow stem about half its length: thorax nearly obconic, less convex than that of *verticillata, Serratulæ, rufipes, tumida* and *platyptera*: prothorax quadrate, a little narrower than the head; its breadth rather more than twice its length: scutum large, broader than long; sutures of the parapsides very distinct, approaching each other; paraptera large, triangular, separated by a space nearly equal to the scutum between the base of the parapsides; scutellum nearly conical, truncate in front, less decumbent behind than that of *verticillata, Serratulæ, curta, annulipes, rufipes, Scultenna, Sittace, tumida, fumipennis, platyptera* and *Abrotani*: metathorax very short, appearing transversely behind the scutellum: propodeon large, obconic, more horizontal than that of *verticillata, Serratulæ, curta, Abrotani, annulipes, rufipes, Scultenna* and *Sittace*, having only one broad shallow channel along the middle: podeon slender, cylindrical, punctured, longer than the propodeon: abdomen very short, smooth, shining, not much more than half the length of the thorax, abruptly decumbent in front and near the tip; its length slightly exceeds its height; metapodeon less than one-fourth of the length of the abdomen, having a short longitudinal channel at the base; octoon of moderate size, nearly as long as the metapodeon; ennaton very large; decaton small; protelum, paratelum and telum very short: wings broad; humerus much less than half the length of the wing; ulna less than half the length of the humerus, more slender than the ulna of *verticillata, Serratulæ, curta, Abrotani, annulipes, rufipes, Micipsa, brevicollis* and *nitida*; radius as long as the ulna; cubitus nearly as long as the ulna; stigma small, emitting a short branch.

Female.—Head as broad as the thorax: antennæ slightly clavate, shorter than the thorax; first joint long, slender; second cyathiform; third and fourth very minute; fifth and following joints to the ninth long but successively shorter; club fusiform, twice the length of the ninth joint: podeon much shorter than the propodeon: abdomen smooth, shining, slightly compressed, gradually decumbent towards the base and towards the tip, somewhat shorter than the thorax; its height more than half its length; segments not much contracted beneath; metapodeon rather large; octoon and ennaton of moderate size; decaton large above, short beneath; protelum, paratelum and telum very short: oviduct concealed.

Eurytoma Sittace, fem. *Atra, convexa, vix gibbosa, antennis pedibusque nigris, tibiis fuscis, genubus tarsis et protibiis rufis, alis limpidis, nervis fulvis.* (Corp. long. lin. 1; alar. lin. $2\frac{1}{2}$.)

Body convex: head and thorax roughly punctured: head as broad

as the thorax: antennæ slightly clavate, shorter than the thorax; first joint long, slender; second cyathiform; third and fourth very minute; fifth and following joints to the ninth long, but successively shorter; club fusiform, twice the length of the ninth joint: thorax somewhat obconic, less convex than that of *verticillata*, *Serratulæ*, *rufipes*, *tumida* and *platyptera*; scutum of the mesothorax large, broader than long; sutures of the parapsides distinct, approaching each other; axillæ large, triangular, not conniving; scutellum truncate-conical, abruptly declining at the tip, where it forms nearly a right angle: metathorax transverse, very short: propodeon large, obconic, abruptly declining, furrowed distinctly along the middle but less clearly on each side: podeon much shorter than the propodeon: abdomen oval, smooth, shining, slightly convex, not much compressed, as long as the thorax; its height little more than half its length; the segments gathered together beneath; metapodeon, octoon and ennaton of moderate size; decaton very large; protelum, paratelum and telum very short: oviduct concealed: wings broad; humerus much less than half the length of the wing; ulna less than half the length of the humerus, slender like that of *E. Argele*; radius shorter than the ulna; cubitus as long as the radius; stigma small, emitting a short branch.

Eurytoma Scultenna, mas. *Atra, convexa, vix gibbosa, antennis pedibusque nigris, genubus tarsis protibiisque flavis, alis limpidis, nervis pallide fuscis.* (Corp. long. lin. $1\frac{1}{4}$; alar. lin. $1\frac{3}{4}$.)

Body convex: head and thorax roughly punctured: head a little broader than the thorax: antennæ setaceous, nodose, verticillate-pilose, as long as the thorax; first joint long, slender; second cyathiform; third and fourth very minute; fifth and following joints subquadrate, hardly dilated, successively decreasing in size, joined closely together like those of *E. tumida*: thorax somewhat obconic, less convex than that of *verticillata*, *Serratulæ*, *rufipes*, *tumida* or *platyptera*: prothorax transverse, quadrate, not narrower in front; its breadth rather more than twice its length: scutum of the mesothorax broader than long; sutures of the parapsides distinct, approaching each other; axillæ large, triangular, not conniving; scutellum somewhat conical, truncate in front, abruptly decumbent at the tip, where it nearly forms a right angle: mesothorax transverse, very short: propodeon large, obconic, abruptly declining, furrowed indistinctly along the middle and less clearly on each side: podeon cylindrical, slender, dull, punctured, as long as the propodeon: abdomen oval, smooth, shining, compressed, abruptly decumbent in front and towards the tip, little more than half the length of the thorax; its height does not equal its length; metapodeon occupying more than one-third of the dorsum, having a longitudinal channel; octoon rather large; ennaton very large; decaton of moderate size; protelum, paratelum and telum very short: wings broad; humerus much less than half the length of the wing; ulna thick, not half the length of the humerus; radius much shorter than the ulna; cubitus a little shorter than the radius; stigma small, emitting a short branch.

Eurytoma Micipsa, mas. *Atra, convexa, minime gibbosa, antennis pedibusque nigris, genubus rufis, tarsis piceis, alis subfuscis.* (Corp. long. lin. 1; alar. lin. $1\frac{1}{2}$.)

Body convex: head and thorax roughly punctured: head a little broader than the thorax: antennæ slender, setaceous, longer than the thorax; joints from the fifth to the ninth elliptical, hardly dilated, joined together by slender stalks about half the length of each joint: thorax somewhat obconical, less convex than that of *verticillata, Serratulæ, rufipes, tumida* and *platyptera*: prothorax quadrate; its breadth more than twice its length: scutum of the mesothorax broader than long; sutures of the parapsides distinct, approaching each other; axillæ large, triangular, not conniving; scutellum somewhat conical, truncate in front, not falling behind so deep as in the species above-mentioned: metathorax transverse, very short: propodeon large, obconic, more horizontal than in the following species, *verticillata, Serratulæ, curta, Abrotani, annulipes, rufipes, Scultenna* and *Sittace*, and having only one broad shallow channel along the middle: podeon cylindrical, slender, dull, punctured, as long as the propodeon: abdomen oval, smooth, shining, compressed, abruptly decumbent at the base and towards the tip, little more than half the length of the thorax; its height is not equal to its length; metapodeon less than one-third of the length of the abdomen, decumbent in front; octoon of moderate size; ennaton large; decaton of moderate size; protelum, paratelum and telum very short: wings moderate; humerus much less than half the length of the wing; ulna rather thick, less than half the length of the humerus; radius much shorter than the ulna; cubitus as long as the radius; stigma small, emitting a short branch.

Isosoma Nepe, mas. *Atrum, prothoraci macula utrinque fulva, antennis pedibusque nigris, genubus rufis, tarsis piceis, alis subfuscis, nervis piceis.* (Corp. long. lin. 1; alar. lin. $1\frac{1}{2}$.)

Body black, convex, cylindrical: head and thorax punctured: head a little broader than the thorax: antennæ slender, filiform, clothed with long hairs, somewhat shorter than the thorax; first joint slightly bent, dilated beneath; second short-cyathiform; third and fourth very minute; fifth and following joints to the eleventh long, cylindrical, nearly equal in size, or successively, yet very slightly, shorter and broader; tip of the eleventh joint pointed: prothorax very finely rugulose, somewhat shining, rather broader than long, a little shorter and more slender than that of *I. vacillans*, from which it differs also in having a smaller pale fulvous spot on each fore-corner: mesothorax dull; sutures of the parapsides very distinct, approaching each other; axillæ large, triangular, not conniving; scutellum obconic, having a rim round its hind border which is more obtuse than that of *I. longulum, petiolatum*, and *hyalipenne*: metathorax transverse, very short: propodeon dull, obconic, decumbent, coarsely punctured, and having here and there some large shallow excavations: podeon long, stout, cylindrical, dull, punctured: abdo-

men elliptical, smooth, shining, not compressed, scarcely more than half the length of the thorax, a little narrower and less convex than that of *I. longulum* and of *I. longicorne*; metapodeon large, conical, occupying about half the dorsum; octoon scarce more than one-fourth of the length of the metapodeon; ennaton much longer than the octoon; decaton much longer than the ennaton; protelum, paratelum and telum very short: legs black; knees fulvous; tarsi fuscous, paler beneath: wings slightly fuscous; nervures fuscous; humerus much less than half the length of the wing, rejecting beneath a short branch; ulna more than half the length of the humerus; radius less than half the length of the ulna; cubitus a little shorter than the radius; stigma small.

Decatoma Nicææ, fem. *Fulva, dorso antennisque nigris, pedibus flavis, tibiis fusco cinctis, alis subfuscis, nervis flavis, ulna stigmateque fuscis.* (Corp. long. lin. 1; alar. lin. 1½.)

Body convex: head and thorax rugulose, punctured, pubescent, slightly shining: head yellow, piceous on the vertex, as broad as the thorax: antennæ dark piceous, clavate, shorter than the thorax; first joint long, slender; second long-cyathiform, fulvous at the tip; third and fourth very minute; fifth and following joints to the ninth successively decreasing in length; club broader than the ninth joint and more than twice its length: thorax yellow, long-obconic, hardly gibbous: prothorax large, quadrate, broader than long, fuscous on the middle of the hind border: mesothorax piceous, varied with yellow on each side; scutum transverse; parapsides prominent, their sutures distinct; axillæ large; scutellum large, obconic, abruptly declining at the tip: metathorax transverse, very short: propodeon short, obconic, abruptly declining, piceous before, behind and along the middle: podeon minutely punctured, not one-sixth of the length of the abdomen; abdomen fulvous, elliptic, not gibbous, keeled beneath, longer and slightly narrower than the thorax, having the disc above and the hind borders of the segments piceous; metapodeon shorter than one-fourth of the dorsum; octoon much shorter than the metapodeon; ennaton longer than the octoon; decaton twice the length of the ennaton; protelum more than half the length of the decaton; paratelum and telum very short: oviduct just passing the tip of the abdomen: legs yellow; metatibiæ mostly fuscous: wings limpid; nervures fuscous; humerus yellow, shorter than half the wing; ulna slender, not one-sixth of the length of the humerus; radius longer than the ulna; cubitus as long as the radius; stigma of moderate size.

VII.—*Characters of a new Species of* Axolotl.

By Prof. Owen, F.R.S.

Genus Axolotes*.

Gyrinus, Shaw; *Phyllhydrus*, Brooks; *Siredon*, Wagler; *Axolotl*, Humboldt and Cuvier.

Sp. 1. *guttata*. *A.* fusca, nigro-guttata, capite antice rotundato, cauda compresso-lanceolata.

Shaw, Nat. Misc. no. 343, *Gyrinus mexicanus*; Gen. Zool. iii. p. 612. pl. 140, *Siren pisciformis*.

Humboldt and Cuvier, Voyage de Humboldt, Zoologie, 2eme partie, Reptiles douteux, p. 109. pl. 12, *Axolotl du Mexique*.

Home, Phil. Trans. 1824, p. 419. pl. 22 and 23, *Mexican Proteus*.

Wagler, Icones Amphib. tab. 20, *Siredon Axolotl*.

Longitudo 7 unc. ad 14 unc.

Hab. In lacu juxta urbem Mexico.

Sp. 2. *maculata*. *A.* grisea, nigro-marmorata, subtus lactea, capite antice truncato, cauda compresso-rotundata.

Longitudo 3 unc. ad 5 unc.

Hab. In Mexico, in fluviis Sierræ Madre, Chihuahua, lat. 26° 6′ N., long. 106° 50′ W.

Axolotes maculata, nat. size.

VIII.—*On Ova believed to be those of the Large Spotted Dog-fish*, Scyllium Catulus, *Linn.* (sp.).

About the middle of the month of December last, there were sent to the Belfast Museum two plants of the tangle (*Laminaria digitata*),

* This rendering of the Mexican word, first applied generically by Cuvier, has long been adopted by Mayer and other German anatomists: the word is inflected according to the third declension—*Axolotes, is, em, ibus*. The characters of the first known species, for which the trivial names '*mexicana*' and '*pisciformis*' have ceased to be distinctive, are prefixed to render those of the second species more intelligible.

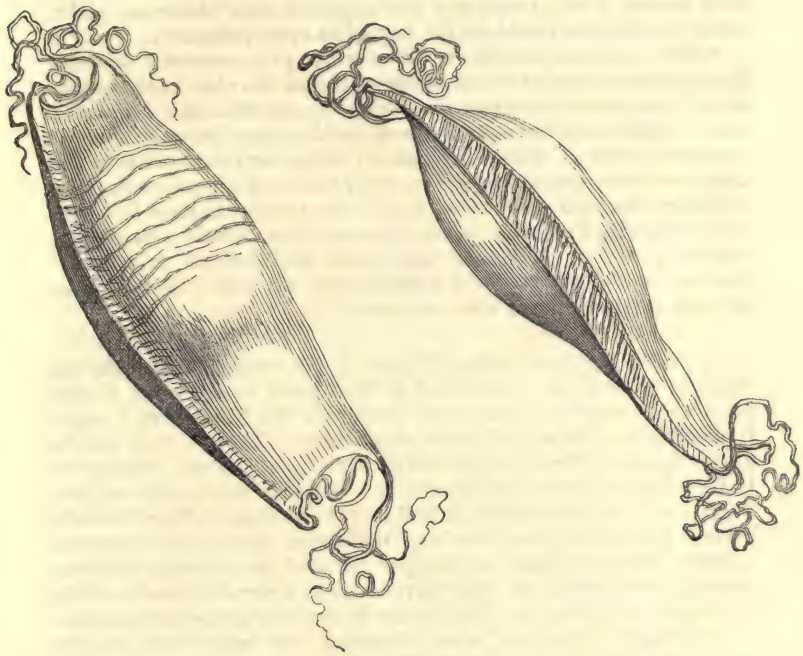
dredged together off Killinchy, Strangford lough, from a depth of between two and three fathoms, and having many large and remarkable ova attached to them by tendrils like those on the well-known "purses," as they are called, of the common dog-fish (*Scyllium Canicula*), though they evidently belonged to a different species. They were new to me and interesting in several respects. To the one plant of tangle were attached fourteen, to the other twelve of these ova: of the fourteen, six were very old, six of "middle age," and two quite fresh—of the twelve attached to the other plant, four were very old, four of middle age, and four quite fresh. Those called fresh had the "white and yelk" as in a newly laid hen's egg; from those termed of middle age, the young fish had probably long since escaped: none remained to bear testimony to its species. The age of the different ova was denoted not only by their own appearance, but by that of the mollusca, zoophytes, &c. parasitical upon them: —on the oldest were *Anomiæ* an inch in diameter; *Discopora hispida*, *Tubularia ramosa*, *Cellularia reptans*, all full-grown; and on them, and those of middle age, were *Lepraliæ* (Johnston) of various species, *Nulliporæ*, and masses of the ova of *Buccinum undatum*.

The number of ova of different ages suggested certain points of inquiry. Their deposition at three different periods of time on the same plant led to the suggestion that the fish may, like certain birds, as the different species of *Hirundines* for example, return time after time to the same spot to deposit its eggs. We can indeed only infer that the same individual has deposited the ova on the different occasions, but the probability is in favour of such inference That the salmon (*Salmo Salar*) returns to its native river—if not to the same "bed" to spawn—we have a notable example in the north of Ireland, where, from the circumstance of the fish of the adjacent rivers Bann and Bush being distinguished from each other by certain peculiarities, those of every age from each river in returning to the fresh water from the sea are known always to seek the ascent of their native stream.

Being unable to find any ova described like those under consideration, I made a sketch of one and submitted it to my friend Mr. Yarrell for his opinion, together with several queries, remarking at the same time, that as "the ova are evidently generically related to those of *S. Canicula*, the first impression is, that they are those of the most nearly allied species *Scyllium Catulus*, especially as we find those of the next nearest ally, at least among British species—*Squalus annulatus*, Nils. (*Pristiurus melanostomus*, Bonap.)—to be of a different form; but, that if they belong to *S. Catulus*, which is said not much to exceed *S. Canicula* in size, it will be singular that the ova should so greatly exceed those belonging to that species as to be double their size, and in consequence of their much greater strength, about four times their weight. The transverse markings represented in the drawing denote plaits, which give to the exterior a handsome appearance; but they are not of specific value, the surface of some ova being quite smooth, of others partially or wholly plaited." It was added—"Is it known *how often* the *Scyllia* deposit their ova?

how many are deposited at one time? how long after deposition the young fish bursts its prison?" In the event of Mr. Yarrell's not knowing the ovum (which proved to be new to him likewise), he was requested to send the drawing, &c. for Mr. Couch's opinion. With respect to *S. Canicula* Mr. Yarrell remarked,—

"I never remember to have observed more than one egg in each oviduct ready for exclusion, but there was frequently one other in each oviduct at the upper end, or about to separate from the ovarium, one on each side. How long they are in passing along the oviduct,



how often deposited, and how soon after deposition the young fish leaves his cell, are points unknown to me; but I suspect in reference to gaining his liberty the young fish is rather in a hurry, for I have more than once taken very small spotted sharks swimming at large before the membranous bag of nutriment had been taken up into the abdomen, and before the young shark had begun to take food by the mouth. I will, however, send your sketch and queries to Mr. Couch."

This gentleman replied,—

"Polperro, Jan. 25, 1844.

"Dear Sir,—I feel an impression that the figure of a 'purse' which I received in your letter of the 24th of December is that of the large spotted dog-fish, *Scyllium Catulus*. Both the British spotted dog-fishes certainly spawn twice in the year, as do many other spe-

cies of fishes that are not commonly supposed to do so, a fact which I have ascertained by observation and dissection. But I have been somewhat unfortunate in reference to the larger spotted dog-fish in not being able to obtain the ova of that fish directly from the body; a circumstance which arises from this fish going into deep water at the spawning time, when our fishermen do not find it convenient to follow them. I have obtained specimens however which I have been given to understand proceeded from this fish, and they very closely resemble the pencil drawing in size, form, the raised ridge at the sides, and in the lengthened tendrils at the corners; the colour a dark brown, but I never saw any specimen with transverse plaits, which may throw doubt on the fact of its appropriation*.

"The ova of the *Scyllia* are deposited in pairs, an ovum descending at the same time to each corner of the uterus; but I am not able to say how many constitute one laying, except that they are numerous. They certainly remain a considerable time before exclusion; a month or two at least, and perhaps more, for the corals to which they have been attached, and especially the *Gorgoniæ*, are often seen growing luxuriantly round the tendrils in a manner to show that most of this growth must have taken place since the deposit. Sometimes also their surface is studded with small shell-fish, as *Anomiæ* and Pectens, of a size to render it probable that the time I have assigned to them may even have been exceeded.

"Jonathan Couch."

As, reasoning from analogy, I came to the conclusion that the ova must be those of *S. Catulus*, and as Mr. Couch has received similar ones which were stated to be the produce of this fish, I have thought it desirable to publish so much as we know of the subject, and to give a figure of the ovum, although actual proof is still wanting as to the species to which it appertains. Some of my queries to Mr. Yarrell bore on the subject noticed in the conclusion of Mr. Couch's letter. Were it known how long the ova of the dog-fish were deposited before the young fish escaped, we could say that the adherent mollusca, zoophytes, &c. must have attained a certain growth within a limited period, but our information is not yet sufficiently positive on this head. The most newly-deposited ova under consideration were externally quite free from all parasitical growth, which was at first sight, or before they were opened, a good indication of their freshness. But whatever the time may be in which the ovum of the allied species *S. Canicula* is deposited before the exclusion of the fish, proof is afforded by one in my collection containing a young dog-fish of this species all but ready for its escape, that before its birth would have taken place, the *Discopora hispida* attached to the outside of its case had arrived at full maturity†.

* As before mentioned, these plaits are not of specific value.—W. T.

† Since the above was written, I have seen in the collection of Mr. R. Ball, Dublin, a similar case containing a young *S. Canicula*, on the exterior of which were groups of *Lepraliæ* of the full ordinary size, and two specimens of *Serpula triquetra* nearly an inch in length.

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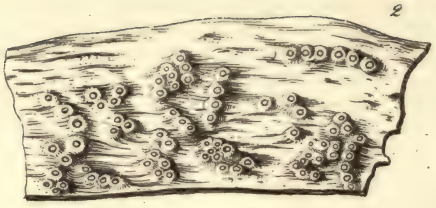
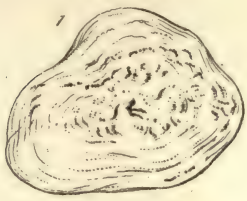
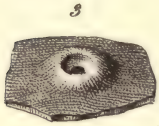
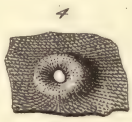


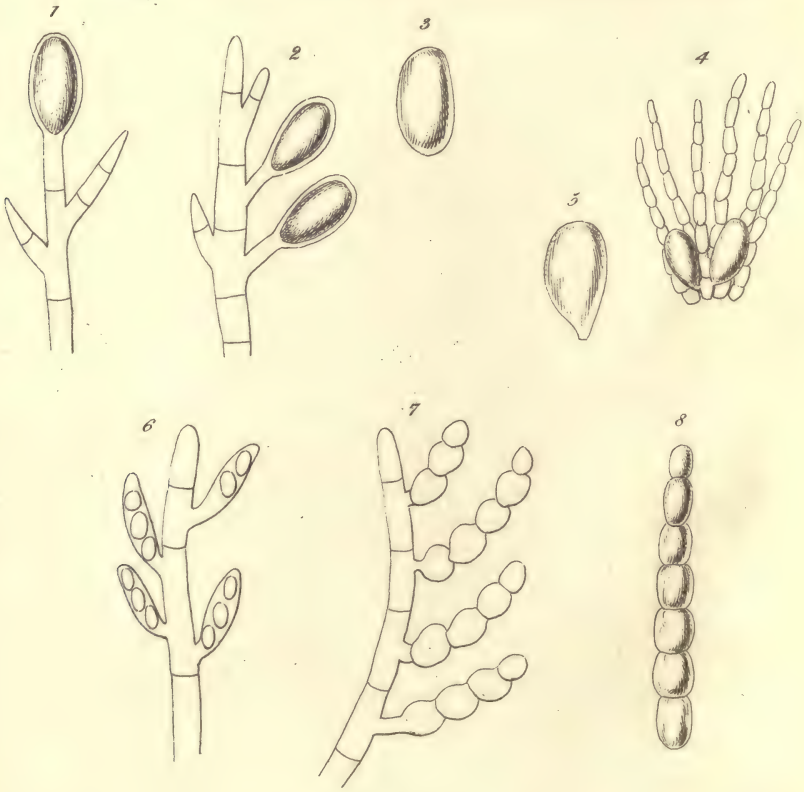






Rhododermis Drummondii.

W. H. Harvey del.



Dr Dickie del. *Fructification of Marine Algæ.* J. D. C. Sowerby fo.

Length of recent* ovum of *Scyllium Catulus*? 4 inches 6 lines; breadth 1 inch 9 lines; depth 3—4 lines; surface smooth or plaited transversely; sides very strong and closely plaited throughout; tendrils very strong. Colour a uniform brown, but differing in shade in different ova.

Belfast, May 1844. Wm. Thompson.

IX.—*Description of a minute Alga from the coast of Ireland.* By Wm. Henry Harvey, Esq.

[With a Plate.]

Rhododermis, Harv. MS.

Gen. Char.—*Frons* carnoso-membranacea, expansa, crustacea, facie inferiore adhærens, e cellulis polygonis *sanguineis* minutis formata. *Fructus*? verrucæ pertusæ in frondem sparsæ.

R. Drummondii, Harv. MS.

Hab. At New Castle, co. Down, spreading over the rocky sides and bases of maritime caves, in places where it is covered by the sea at high water, but exposed, on the ebb of the tide, to the dripping or trickling of fresh water. *Dr. Drummond*, May 1840.

Frond spreading in wide, concentric, but not regularly circular patches of a dark blood or brick-red colour, when dry purplish lake, closely adhering to the rocks on which it grows, and to which it is attached by the whole of its lower surface; of a fleshy-membranous, very tenacious substance, glossy, about half a line in thickness in the centre, but becoming gradually thinner toward the margin, composed (as shown by the highest power of the microscope) of strata of minute polygonal cellules closely packed together, and filled with brilliant rosy endochrome. The surface appears marked with wavy interrupted lines, and more or less thickly furnished with wart-like dark-coloured tubercles, which are either scattered or grouped together in linear masses. These tubercles are hemispherical, prominent, of the same structure as the rest of the frond, deeply coloured at the margin, but in the centre colourless, and generally pierced by a hole which goes through the frond. It is doubtful whether they contain the fructification. Dr. Drummond was not able to discover sporules in any of them in the recent plant, nor have I been more fortunate with the dried specimen. In outward aspect they much resemble the fruit of *Grateloupia*, but a minute examination shows them to be invariably empty.

Though undoubtedly of marine origin, the presence of some fresh water in the absence of the tide seems favourable to the growth of this Alga, as Dr. Drummond observed the colour to

* The specimens have dwindled in drying to about one-half their original size.

be much more intense and brilliant in places where the fresh water dripped or trickled over the rocks than where they were comparatively dry. In the first of these the crust was of "a dark blood-colour," in the last "a brick-red." But among the former he observed some patches which were "a bright orange." This he attributed to a fuller state of fructification, but neglected to put up specimens. It may, however, be doubted whether this last colour did not originate in an excess of fresh water, which we know changes to orange the red of many *Florideæ*, as particularly observed in *Nitophyllum versicolor*.

Probably this production is common in similar situations on other of the British coasts, but, with numerous others of the crustaceous class of Algæ (a neglected group, which will repay in novelty an observer who has patience to look for them), has been hitherto unnoticed or passed by. Though our information respecting it is still imperfect, its characters are such as to exclude it from any established genus with which I am acquainted. The brilliant red colour and substance sever it from *Ralfsia*, Berk. (*Padina*? *deusta*, Hook.), which in habit it more nearly resembles than any other British plant; but this is a resemblance of habit alone, and therefore more one of analogy than affinity. With the Mediterranean *Peysonellia* it has, seemingly, more affinity, and it is in the neighbourhood of that genus that I propose, for the present at least, to place it. W. H. H.

EXPLANATION OF PLATE II.

Fig. 1. *Rhododermis Drummondii*, natural size.
Fig. 2. Portion near the margin, magnified.
Figs. 3 and 4. Different views of tubercles.
Fig. 5. Portion of the surface highly magnified.

X.—*Researches on the Organization of the Invertebrate Animals of the Western Coast of France.* By M. de Quatrefages. Communicated by Alfred Tulk, M.R.C.S.

The admirable report of M. Milne Edwards upon this subject, to which want of space in a recent number of this Journal admitted only of briefly directing the attention of the reader, contains amongst others a most valuable series of observations by M. Quatrefages relative to the organization of certain Gasteropoda, which have hitherto been incorrectly associated with the genus *Doris* under the general title of Nudibranchiata, but which differ much, through the degradation of their internal structure, from all the ordinary Mollusca. As regards the general form of their body, the generative organs and the position of the central nervous ganglia, these animals resemble the other Gasteropoda,

but are widely separated from the normal type of that group by the structural conditions under which the functions of *circulation*, *respiration* and *digestion* are performed. The great physiological distinction in the nature of the *circulatory apparatus* of the class *Mollusca* and *Articulata* consists in its being provided in the former with two systems of membranous vessels united at one end by the intervention of a heart, and communicating at the other by a network of capillaries, while in the latter one of these systems (the afferent or venous) is always wanting, and is supplied by lacunæ or intervals between the different organs, within which the blood flows. Some years ago M. Quatrefages had determined the fact, that in the compound *Ascidia* and several other molluscoid animals, the vascular system only existed in the thoracic region of the body, and was replaced throughout the abdomen by interstitial meatuses resembling those in the Articulata; and that in the Bryozoa the inferior representatives of the same zoological type, there existed no blood-vessels whatever, and the nutrient fluid was distributed through large cavities of the body. Hitherto however no true mollusk was known in which the circulation was not completely vascular, nor could it have been well anticipated that one of the highest groups of the class should present the contrary character; still the Eolidians and other analogous Gasteropoda have furnished such a structural degradation in different degrees. In the first a well-developed heart and arteries exist, but no proper veins, the blood being returned by means of a system of irregular lacunæ similar to those met with in the Crustacea; while in other species both the heart and arteries have disappeared, and the circulation becomes as incomplete as in the Bryozoa.

Corresponding modifications are entailed by the above in the structure of the *respiratory* organs. There are no branchiæ or pulmonary sacs in the present Gasteropoda, as in the ordinary Mollusca: respiration is either simply exercised by the general surface of the integument, or limited to particular appendages upon the back of the animal; but even in the latter case no vascular network enters into their composition, and to supply this deficiency, nature has introduced a combination of the *digestive* with the respiratory system, that was hitherto believed to occur only in the Medusæ and different Entozoa. The digestive cavity gives off a system of canals, the ramifications of which penetrate the branchiform dorsal appendages, and within these the nutritive matters, being directly conveyed, are submitted to the influence of the air before being sent to the various parts of the body. This complex vasculo-gastric system has been elaborately studied by M. Quatrefages in the genus *Eolidina*; in others it is constructed upon a more simple plan, reminding us of that of the

digestive cavity in some *Hirudines* and *Planariæ*. In the genera *Pelta* and *Chalidis* no ramified appendages are found, but only two large sacs, into which the alimentary substances enter and remain for some time.

The nervous system is also less perfect than in the ordinary Gasteropoda, and approximates the Tunicata; the postœsophageal or ventral ganglia, and the transverse commissure uniting them and completing the œsophageal ring posteriorly, being frequently wanting, as are likewise the labial ganglia.

For the reception of these peculiarly-organized Gasteropoda, M. Quatrefages proposes the establishment of a new order in that class, to be called Phlebentera, and which, with the genera already mentioned, must include the genus *Actæon*, confounded hitherto with the Aphysians, and, in all probability, *Glaucus*, the Placobranchiata, and all other Gasteropods deprived of lungs and vascular branchiæ. Lastly, certain *Planariæ* may perhaps be inserted under the same group.

M. Quatrefages has also given to science a most instructive memoir upon those polyps which, under the form apparently of rugose amorphous crusts, are frequently found upon the whelk-shells inhabited by the Paguri or hermit-crabs; the species had however always been confounded with the *Hydra squamata* of Müller, and neither its structure or mode of reproduction had been studied. These polyps, designated by our author under the name of *Synhydra parasita*, live attached by their base to a common laminiform floor supported internally by a corneous network and analogous to the polypary of the *Gorgonia*, but of a more simple structure, resembling that of the skeleton of the sponge. Thus associated simply in colonies by their bases, we might suppose that each individual polyp exercised its functions independently of another; but they are in fact all united by a system of capillary canals lodged deeply within the common basilar tissue, and which establish ready communications between their respective stomachs.

The same arrangement for rendering the alimentary matters digested by a single polyp available to the nutrition of the entire colony may be observed also in the *Alcyonia*, the *Corallinea*, the *Gorgonia*, *Cornularia*, &c., but previous to the discovery of M. Quatrefages was unknown to occur in the Hydras. Another particularly interesting fact is the singular structure of a certain number of these polyps thus united in a kind of tuft. The one kind present the usual form of Hydras, having a mouth surrounded by filiform tentacles, so that they can directly obtain food; while the others are destitute both of oral orifice or appendages, and depend solely for nutrition upon the products of digestion in the former being conveyed to them by the system of

canals already mentioned. Living thus as parasites, they yet perform important uses in the œconomy of the polypary, since, charged with the process of reproduction, they appear specially destined to ensure the establishment of new colonies.

M. Quatrefages has seen the *Synhydræ* propagate by three very distinct methods. In the one case the young individual proceeds from a bud formed upon the surface of the common basilar tissue, and which is developed nearly in the same manner as the reproductive gemmules of the Hydras and Sertularias; in another, ovules like those of the sponge arise in this common tissue; and lastly, reproductive bodies (*bulbilli*) are met with upon the free portion of the polyps, which cannot be likened either to gemmæ or ovules, for they grow by an extension of their tissue like the first, and, like the second, separate completely from the parent stem before becoming developed into new individuals. The reproductive gemmules serve to increase the population of the colony in the midst of which they are formed; the ovules remain probably buried in the basilar tissue after the winter has destroyed the polyps covering it, and produce other Hydras on the following spring; while lastly the bulbilli, becoming detached and borne afar by the currents, fix themselves at length in some appropriate spot, develope, and multiplying again by gemmæ, found a new colony, in a manner similar to that by which the compound Ascidia disperse to a distance their sessile societies by means of locomotive larvæ. These bulbilli are exclusively produced by the astomatous polyps, around the summit of which they are grouped, the polyps provided with a mouth appearing not to participate in any degree in the work of generation. The first then are the reproductive, the second the nutrition-serving individuals, and both exhibit corresponding differences of structure. The tentacles of the reproductive polyps are represented only by tubercles, and their digestive cavity resembles that of a polyp whose development is not completed and the stomachic cavity not yet open externally. Arrested as regards the functions of nutrition and of animal life, all the energies of their organism seem concentrated upon the exercise of the generative power; for there is nothing that could lead us to suppose that the nutritory individuals are males, and the astomatous females; but rather that the two great physiological acts, the one necessary to the preservation of individual life, and the other destined to perpetuate the existence of the species, are here exhibited under a separate and independent form in the same community. This mode of propagation by bulbilli in the *Synhydræ* constitutes a form of reproduction not hitherto well determined to occur in the animal kingdom, and we cannot therefore peruse the beautiful researches of M. Quatrefages without feeling their interest no less as bear-

ing upon general physiology than upon the special history of the polyps.

A third series of researches by the same author has been devoted to the study of the organization of the Annelida, with a view of determining how the dominant type of that natural group is modified or lowered either in the inferior species, or in those worms which have been ranked by many zoologists among the Entozoa. He has ascertained, in examining the comparative anatomy of the nervous system in *Eunice, Nereis, Phyllodoce, Glycera,* and some other newly discovered genera, that the ganglionic system is far more complex than has been supposed, and exhibits specific modifications analogous to those which have been observed in Insects and Crustacea.

The *vascular* system in all the Annelida studied up to the present time by anatomists has been found to present a very considerable amount of development. In some however, as in certain *Tubicolæ,* M. Quatrefages has proved that the circulation is not performed by vessels, but through lacunæ situated between the different organs: thus, in a species of *Amphicora,* very nearly allied to that discovered by M. Ehrenberg, the blood, easily recognisable from its green colour, is not inclosed in vessels, but between the subcutaneous muscular layer and the kind of mesentery that envelopes the alimentary canal; and lastly, in a new genus of Annelida Errantia allied to *Syllis,* and called by our author *Doyeria,* there exist only imperfect rudiments of a vascular apparatus, which is reduced to a simple dorsal vessel.

The genus *Aphlebine* of M. Quatrefages furnishes another striking example of such organic degradation. In the ordinary Annelida the circulation is performed as in the higher animals, by the alternate contraction and dilatation of a part of the vascular system; but in the present genus, the blood, instead of being propelled by any organ analogous to a heart, is set in motion by the repeated strokes of a series of microscopically minute palettes, which are composed of vibratile cilia united in that form, and placed upon the walls of the visceral cavity behind the base of each foot. An analogous mechanism has been observed by Milne Edwards in the Beroes.

The affinity of internal structure which previous observers had perceived to exist between the Annelida and Rotatoria has been rendered still more intimate by another discovery of M. Quatrefages, who found upon the coasts of Brittany an Annelide much resembling in general conformation a young *Syllis,* but which supported upon either side of its body a series of locomotive organs analogous to the vibratile discs of the Rotifers, and so disposed as to simulate when in motion the revolutions of a paddle-wheel. The feet in this singular Annelide, designated by the name of

Dujardinia, are furnished with bristles as in the other Annelida Errantia; but these are merely passive weapons of defence, since they remain perfectly immoveable. Sometimes the animal changes its position in the water by agitating its tail briskly like a long oar, but in general it swims slowly by means of the above-mentioned lateral palettes, which consist of cilia circularly arranged upon the edges of cup-shaped cavities, supported by papillæ placed upon the sides of the body and between the feet. In the form of its digestive tube and the large size of its ova, *Dujardinia* also approximates the Rotifera.

Some further details are of interest from tending to indicate the links whereby the Annelida are connected to the *Planariæ* and Entozoa. Thus the *Nemertæ* agree with the Annelida in the general arrangement of their vascular system, but resemble much the *Hirudines* in the structure of their buccal apparatus and many other points of internal organization, while their reproductive organs are analogous to those of many Entozoa; their nervous system may be compared to that of the *Lingulæ*, and their digestive tube, in place of extending the whole length of the body and opening posteriorly by an anal orifice, as in all the typical Annelida, terminates towards the anterior third of the body in a cul-de-sac which communicates externally by the mouth alone, as in some of the lower organized Entozoa and most Zoophyta.

The very singular observations made by M. Quatrefages upon the propagation of the genus *Syllis* have already been given in a previous number of this Journal. It remains only for us to add, in respect to the Annelida, that in a large number of the Annelida Errantia and *Tubicolæ*, and also in the *Thalassemæ* and *Nemertæ*, which establish the passage between the ordinary Annelida and Entozoa, he has recognised the existence of distinct male and female individuals, has observed the formation of the spermatozoa in the *Nemertæ*, and by his remarks upon the development of the ova in the *Terebellæ*, has extended to the class Annelida the important fact determined by Herold, Rathke, and other embryologists, respecting the relation of the vitellus to the dorsal surface of the embryo in Insects, Arachnida and Crustacea.

Lastly, M. Quatrefages, in examining the mechanism of motion in the polyps of the genus *Edwardsia*, has arrived at the same conclusions with Mr. Bowman relative to the theory of muscular contraction; for he has observed that the fibres of one and the same muscle do not all act simultaneously, but that those which contract, drawing along with them the adjacent fibres in a state of repose, give rise to the zigzag folds which have been considered as the efficient cause of the shortening of the muscle.

Touching the subject of animal phosphorescence, our author has been led, from the microscopic study of the small transparent

Annelida, to infer that its production depends very intimately upon the influence exerted by the nervous system in giving rise to muscular contraction. This, observes Milne Edwards, becomes highly probable from the fact, that in the Beroes of the Mediterranean Sea I have constantly remarked that their very brilliant light emanated from the ciliated sides of the body, the principal seat of the locomotive function.

XI.—*Further Observations on the Ornithology of the neighbourhood of Calcutta.* By Edward Blyth, Curator to the Museum of the Asiatic Society of Bengal. *With Notes by* H. E. Strickland, M.A.

Calcutta, March 18, 1844.

The cold season of 1843–44 having now terminated, and the time for collecting specimens of the feathered class fast drawing to its close, I shall again pass under review the various species of birds which I have hitherto succeeded in procuring in this immediate neighbourhood, a task to which I am partly impelled by perusal of Mr. Strickland's interesting 'Notes' (vol. xiii. pp. 32 *et seq.*, *ante*), which have just reached me.

Nos. 1 and 4*. *Palæornis Alexandri* and *P. pondicerianus*. Both of these are strictly hill species, and I doubt if either of them is ever met with in the vicinity of Calcutta. With reference to the enumeration of the species of this genus which I appended in a note, I may remark that there is a "*Psittacus* (*Conurus*) *himalayanus*" of Lesson described in the 'Zoologie du Voyage de M. Bélanger,' p. 239, which is doubtless a *Palæornis*, and would seem to resemble *P. schisticeps*, except in having the under parts to the belly uniform ash-gray. "Inhabits the valleys of the Himalaya." I have never seen it.

The *Psittaculus vernalis* appears also to be exclusively a hill species.

Of the *Raptores*, I have prepared an elaborate monograph of the Indian species, wherein a very considerable number of synonyms have been reduced, and which is at present awaiting publication.

The whole of the true Falcons of India appear to visit this neighbourhood during the cool season, with the exceptions of *F. Aldrovandi*, which I have only seen from the Himalaya, and the *F. cherrug* of Hardwicke and Gray, which is evidently the lanner, *F. lanarius*, and which is not yet well established as Indian, though the name *F. cherrug* occurs in a MS. catalogue of the birds of Nepal prepared by Mr. Hodgson. I have somewhere read that a large falcon called *Cherg* or *Cherrug* is highly esteemed in Persia for flying at bustards and other large game: and there can be little doubt that the lanner

* These numbers refer to Mr. Blyth's paper, Annals, vol. xii. p. 90, and vol. xiii. pp. 113, 175.

exists along the Himalaya, especially towards the N.W. in the alpine Punjab. Of the rest, I have obtained *F. shaheen*, Jerdon, and *F. vespertinus*, in addition to the species noticed in the catalogue; my friend Mr. Earle tells me that he has shot *F. peregrinus*; and I am satisfied of the occasional occurrence of *F. juggur*, Gray and Hardwicke, vel *F. luggur*, Jerdon.

The word *Ierax* I so spelt to distinguish it in a more marked manner from the genus *Hyrax* among the mammalia. I have one species from Assam, and another from Nepal and Arracan; a third appears peculiar to the Malay countries, and a fourth inhabits the Philippines. The true *Falco cærulescens*, Linn., founded on Edwards, pl. 108, is certainly a distinct species from any of the four known to me. In the Assamese *I. melanoleucos*, nobis, the tibial plumes are white; in the Nepalese *I. eutolmus*, Hodgson (*Falco cærulescens*, var. *a*, Latham, from near Sylhet), they are bright ferruginous; and in the Malay species deep black. Latham's description of Edwards's alleged Bengal species agrees neither with *I. eutolmus* nor with *I. melanoleucos*.

No. 9. I have instituted a division *Nisastur* for the reception of *Falco badius*, Brown, and the species allied to it, conceiving that they do not range satisfactorily either in *Dædalion* (*Astur*, Bechstein) or in *Accipiter**.

No. 14. This I fully suspect will have to be recognised as a distinct species from the European *Circus æruginosus*, v. *rufus*, in which case it will apparently stand as *C. variegatus*, Sykes; and Latham's *Rufous-eared Falcon*, no. 103, and *Konta Falcon*, no. 117, are both referable to it. If I remember rightly, M. Lesson has some remarks on the Indian "variety" of *C. æruginosus* in the 'Zoologie du Voyage de M. Bélanger.' The *extreme frequency* of specimens with ash-coloured tail and part of wings, as figured in Gould's 'Birds of Europe' *from a Himalayan specimen*, first led me to entertain this suspicion, and the Indian bird appears also to be always smaller, to have the owl-like ruff more developed, and to be further distinguished by having golden-yellow irides. Now of the considerable number of European specimens which I have seen, I do not remember to have met with one having the ash-coloured wings and tail†, nor do I think the irides were ever pure yellow. Referring to M'Gillivray's 'Rapacious Birds,' I observe he mentions the irides of the male to be "orange," and those of the female to be "reddish-yellow." Mr. Jenyns, without distinguishing the sex, describes the "adult in its

* A recent skin has just been brought to me of a small *Accipiter* shot a few miles down the river, which is not improbably the *Khandesra* hawk which Mr. Jerdon has been long trying to procure.

† It is however certain that specimens so coloured do occasionally occur in Europe, as they have been accurately described by various authors from Brisson to Yarrell. The scarcity of such specimens in Europe is probably owing to the influence of man, who usually destroys these birds before they become aged. I do not therefore think that there is at present sufficient evidence to warrant the specific separation of the "Moor Buzzards" of India from those of Europe.—H. E. S.

fourth year" to have "reddish-yellow" irides; in the second year "brown;" and in the young of the year "dusky-brown"; but Montagu describes a female before him to have "yellow" irides, in which he is perhaps copied by Fleming. None of these authors mention the presence of any ash-colour on the wings and tail; but I observe that Mr. Gould's Himalayan specimen is noticed as "showing a curious change of plumage" by Sir W. Jardine in the 'Naturalist's Library.' So far from being unusual is it however in this neighbourhood, that I have seen two or three in the course of a day's excursion, and have had at least a dozen specimens thus coloured brought me within the last few weeks, and two or three only with dark wings and tail. With respect to the size, Mr. M^cGillivray assigns the following as the respective dimensions of the sexes of the British species. Length to end of tail 21 and 24 inches; of wing 16½ and 16¾ in.; of tail 10 and 9¾ in. (!); and alar expanse 50 and 52 in. The dimensions of the Indian bird are 19 and 21½ in.; wing 15 and 16 in.; tail 8¾ to 9 and 9¼ in.; and alar expanse 45 and — ? In four gray-winged males before me, the length of the wing varies from 14¾ to 15⅓ in., and in two dark-winged (young) males it is only 14½ in. In the gray-winged specimens, the pale head and throat never contrast remarkably with the rest of the plumage, as in the young of both sexes, and commonly in the European species; but the central dark lines to the feathers are usually much developed, often leaving but a slight lateral pale or rufous edge to each feather. For a minute description however, I must refer to my 'Synopsis' of Indian *Raptores* *.

No. 15. This I suspect is the *Falco bido*, Horsfield, and the species would accordingly now stand as *Spilornis bido*. *Falco albidus* of Cuvier and Temminck, v. *Buteo melanotis* of Jerdon's 'Supplement,' is merely the young, as was first intimated to me by Mr. Jerdon, an identification which I have since verified †.

No. 16. Mr. Strickland, following Mr. G. R. Gray, is quite in error respecting the generic location of the birds which I formerly referred to *Spizaëtus*, and which must now be restored to *Nisaëtus* of Hodgson, a very distinct form, represented by the following Indian species:—1. *N. caligatus* (?); *Falco caligatus* (?), Raffles; *F. niveus*, Tem.; *N. nipalensis*, Hodgson; *Bauj Eagle* and probably *Jerwied*

* The European species may perhaps likewise be found here, in which case, however, I think it likely that such closely allied races would be apt to coalesce. While treating of this genus, I would also suggest that the supposed female, *C. Montagui*, described by Mr. Selby to have the lower parts "orange-brown, without spot or streak," may possibly be an adult female of *C. Swainsonii*.

† Since the above was written, one of my shikarees has come in with a fine collection of *Raptores*, procured during an excursion towards the Soonderbuns. Among them are two species which I have not procured before in this neighbourhood;—*Circaëtus gallicus*, and a remarkable specimen of a crestless *Pernis*, which is the *P. Ellioti* of Jerdon's list, and doubtless also that of Lesson in Bélanger's 'Voyage'; I am not sure also that it differs specifically from *P. apivora*. [In a note dated three days later, Mr. Blyth says, "I have got two more specimens of the *Pernis*, and these lead me to suspect that *P. cristata*, *Ellioti*, and *maculosa* of Lesson are all one and the same."]

Eagle of Latham, nos. 74 and 77 : this bird is very common in Lower Bengal, and both sexes become wholly of a dusky black colour with full maturity, which renders the name *niveus* bestowed by Temminck peculiarly inappropriate * ; in Southern India it does not appear to have been met with. 2. *N. cirratus* (Latham), founded on the *Crested Indian Falcon* of Willughby ; *F. cristatellus*, Tem., but certainly not *Spizaëtus cristatellus* of Jardine and Selby's ' Illustrations of Ornithology '; *N. nipalensis*, crested variety, and since *N. pallidus*, Hodgson : nearly allied to the last, but distinguished by its splendid drooping occipital crest, which in a fine specimen before me (procured so near as at Midnapore) measures $5\frac{1}{2}$ inches in length, whereas in *N. caligatus* (?) there is invariably but a slight indication of the crest common to the three other Indian species of this group ; the shape of the dorsal feathers also well distinguishes this species from the preceding one. 3. *N. pulcher*, Hodgson ; and 4. *N. Kieneri*, which had already been thus identified by Mr. Jerdon.

To *Limnaëtus* may be referred the *Morphnus hastatus* of Lesson, v. *Spizaëtus punctatus* of Jerdon's ' Supplement,' and *Cawnpore Eagle*, Latham, of which I have recently obtained two specimens in this vicinity, an adult and a young one ; and Mr. Jerdon informs me that he also has lately procured several, among which are pale varieties analogous to those of *Aquila nævia* (*Vindhiana* †).

I have also procured *Aquila mogilnik* (*imperialis*) ; *Aq. nævia* (two adults beautifully spotted, another adult totally devoid of spots, but the feathers of both silky and finely glossed with purplish), the *Aq. fulvescens*, Gray, is the young ; and several specimens of *Aq. pennata*, vel *Spizaëtus milvoides* of Jerdon. This last is of course the Indian variety of *Buteo lagopus* noticed by Latham : and the reference of the same author to the Kites of India, which occurs in his description of the British kite, refers of course to the common Indian species, his *Cheela Eagle*, nos. 66, 111, and 112.

Nos. 17 to 20, *Fishing Eagles*. I shot a specimen of *Haliaëtus Macei* a few days ago, in a transitional state of plumage, passing from the *H. lineatus* of Hardwicke's drawings into the *H. unicolor*, ibid. ; which latter I see is considered by Prof. Brandt as probably identical with *Falco leucoryphos*, Latham :—vide vol. xi. p. 114, *ante*. That I have rightly identified the *H. unicolor*, Gray, there can be no doubt whatever ; and I very strongly suspect that to the *F. leucoryphos* must be referred the *F. ichthyaëtos*, Horsfield, described in immature plumage, and which would now accordingly rank as *Ichthyaëtus leucoryphos*. This bird is very common in the Bengal Soonderbuns. The *Hal. blagrus* is considerably less so, at least to judge from the comparative number of specimens which are brought me, but this also is far from being rare : it is evidently the *Maritime Eagle*, no. 67, of Latham,

* This is analogous to the change which converts *Buteo lagopus* into the *B. Sancti Johannis*, Auct. Mr. M^c^Gillivray was unaware of the occurrence of this bird in the dark plumage within the British Islands, but a specimen in the dress adverted to was obtained in Epping Forest by Mr. Doubleday.

† On further consideration, I feel very doubtful respecting the distinctness of this from *F. limnaëtus*, Horsfield.

as well as his no. 82, and in second plumage it is his *Kumpa-maur Eagle*, no. 72. *Pandion haliaëtus* is also very common in the Soonderbuns, being of course the *Bengal Osprey* of Latham, but differing in no respect from the European species. For *Haliaëtus pondicerianus* must now be read *Haliastur indus*.

No. 22. The *Elanus melanopterus* of Bengal has always its outermost tail-feather from $\frac{3}{8}$ to $\frac{1}{2}$ inch shorter than the rest, which is the sole character upon which the Prince of Canino founded his American *E. dispar*; the adult is likewise always distinguished by a slaty-black spot at the extremity of the white on the under surface of the wing, and immediately impending the base of the first primaries. Does this correspond to the oval spot of black mentioned as occurring in Gould's Australian *E. notatus* * ?

Respecting the Indian Vultures, information concerning which is sought by Mr. Strickland, I have already informed you (vide vol. xiii. p. 115).

A superb living *Vultur cinereus* has been sent by Major Jenkins from Assam, which enables me to refer to this species beyond all doubt the so-called *V. monachus* figured by Hardwicke, and the head alone of which is published by Gray. Latham describes this drawing under the head "Chocolate Vulture." My bird is now casting its first primaries, and should therefore be in its second year, the colouring of the head being nearly as represented on the plate. In the breadth of skull and aquiline strongly hooked beak, this bird approaches the division *Otogyps*, and it has been separated by Mr. Hodgson under the somewhat strange name of *Polypteryx*.

Of Owls, I have added to the catalogue *Ketupa Leschenaulti*, which is by no means rare; *Urrua umbrata*, nobis, which is less common; and *Scops sunia*, Hodgson, of which beautiful little species I procured a pair that were taken with bird-lime. There are no less than five Indian species of true *Scops*, exclusive of *coromanda*, which is probably an *Urrua*, Hodgson. The *U. coromanda*, apud Hodgson, is my *U. umbrata*; and the same is evidently alluded to by Latham in his description of *Strix coromanda*, as represented in a drawing which he saw in the possession of Sir Joseph Banks, the figure measuring 20 inches in length; but it cannot be the *Strix coromanda* of Hardwicke and Gray, being much darker in colour, in addition to its very superior size. Mr. Jerdon has also recently obtained *U. umbrata* in the south.

That *Strix hirsuta*, Tem., must be referred to the Sumatran *Str. scutulata* of Raffles, I have this further evidence, that the Bengal species is quite common about Singapore; and it is also the *Ominous Owl* of Latham, or *Col pecha* (death-owl) of the Bengalees, by whom its cry is believed to forebode the death of any sick person within whose hearing it is uttered.

* The above remarks are very important, as they seem to show that the *Elanus* of America and of Australia is the same species as that of the old world. The wing-spot in *E. axillaris*, Lath. (*E. notatus*, Gould), exactly agrees with Mr. Blyth's description, except in being *sooty-black* and not "*slaty-black*."—H. E. S.

No. 27. I observe that Sir W. Jardine remarks, in the 'Naturalist's Library' (*British Birds*, vol. i.), that—"Of the extra-European specimens of birds which are considered to be identical with the English barn owl, the under-parts are always more tinged with ochraceous." This, however, certainly does not apply to the common Indian barn owl, which, as I before stated, differs neither in this respect nor in any other from the bird of Europe. I have Calcutta specimens with under-parts of the most pure snowy-white, and others more or less coloured beneath, precisely as in those of England.

No. 27 *a*. I have obtained *Ketupa Leschenaulti* half-grown, and from the analogy of plumage I feel confident that *Strix coromanda*, as figured by Hardwicke, is the young of my *umbrata*, but certainly not the true *coromanda*.

No. 31. This is *Buceros albirostris* of Shaw, a species which represents *B. malabaricus* of the Indian peninsula, in Bengal, Nepal, Assam, and to the eastward of the bay of Bengal. Latham, however, has badly figured it as *B. malabaricus* in his vol. ii. pl. 38.

No. 32. I can perceive no good distinction between the Hoopoes of Bengal and Southern India, further than that the latter are rather smaller and considerably more deeply coloured. The Bengal bird is decidedly the European hoopoe, and the position of the white bar upon the tail varies in different specimens, being in some also much more oblique than in others.

No. 33 *a*. I have obtained a single specimen of *Merops phillipinus*.

No. 34. This common species is replaced in Assam, Tipperah, Arracan and the Tenasserim provinces by *Coracias assamensis* (M'Clelland and Horsfield), which in those parts appears to be equally common.

No. 37. *Halcyon amauropterus* is found at all seasons, and may generally be met with in the Botanic Garden and one or two other localities. I have also obtained *H. atricapillus*, which Mr. Jerdon has likewise recently done in Southern India; and *Todirhamphus collaris*. *H. coromandus* I have received from Nepal and from the eastern side of the bay.

No. 42. *Bucco caniceps* is common in the Soonderbuns, and to the eastward abounds in Tipperah and in Arracan.

No. 43. *Picus strictus* appears to be the *P. goensis* of recent authors, but does not well agree with Daubenton's orginal description. This and some allied species constitute my division *Chrysocolaptes* (Journ. As. Soc. B. no. 59. p. 1004), which I consider to be very distinct from Mr. Strickland's *Brachypternus*, founded on *P. aurantius*, v. *bengalensis*.

No. 43 *a*. *Picus* (*Gecinus*) *striolatus*, nobis, J. A. S. B. vol. xii. p. 1000, has been procured near here by W. Earle, Esq.

No. 48. I have obtained several specimens of *Yunx torquilla*.

No. 52. For notices of this extremely variable species, vide J. A. S. B. xi. 908, and xii. 241 and 944, where also are described several species of *Centropus*. I may remark that I have received *Cuculus Sonnerati* from Singapore as well as from Southern India *. *Eudy-*

* Is not *C. Sonnerati* the young of some other species?—H. E. S.

namys orientalis was omitted by an oversight; and another species to be added to the list is *Phœnicophaus tristis*, the *Ph. longicaudatus* of my monograph of oriental *Cuculidæ*.

Nos. 56, 57 and 58 are true *Caprimulgi*.

No. 58 *a*. *Caprimulgus indicus*, apud Jerdon, procured in this neighbourhood, and presented to the Society by my friend Willis Earle, Esq. The same gentleman has also shown me part of a collection formed in Monghyr, a range of hills at no great distance up the river, among which I perceive various species that do not occur in this immediate vicinity, e. g. *Butastur* (Hodgson) *teesa*; *Urrua bengalensis* (*Otus bengalensis*, Franklin; *Urrua cavearia*, Hodgson); *Picus mahrattensis*; *Zanclostomus sirkee*; *Lanius lahtora*, *L. erythronotus*, *L. Hardwickei*; *Malacocercus chatarhæa*; *Thamnobia fulicata* (the female of this is *Saxicolides erythrurus*, Lesson in Bélanger's 'Voyage'); *Motacilla variegata*, Lath. (not of Vieillot; *M. picata*, Franklin); *Sitta castaneoventris*; *Columba cambayensis*; *Philomachus ventralis*; *Cursorius asiaticus*;—and of species which are rare here, *Cuculus canorus* and *Oriolus aureus* of my list; both the latter and *O. chinensis* I have also received from Midnapore. I have also reason to believe that on the same range occurs the *Garrulax ruficollis* (Jardine) (*Ianthocincla lunata*, M'Clell.), of which I lately received a few specimens from Tipperah.

No. 59 *a*. Add a *Cypselus* allied to *C. australis*, Gould, and identical with that received from the Deccan by Mr. Jerdon as noticed in J. A. S. B. vol. xi. p. 886.

No. 61. *Corvus macrorhynchos*, v. *culminatus*. A pair of these birds which I lately shot measured each 19½ inches by 3 feet in alar expanse; wing 12 in. and tail 7¾ in. Mr. Jerdon, however, gives length 21 in.; of wing 13$\frac{4}{10}$ in.; tail 7¾ in.; and Col. Sykes assigns, "length 14 in., and tail 7 in.," which, *added together*, gives the same total dimensions as are stated by Mr. Jerdon. It doubtless varies in dimensions like the next species.

No. 62. The variations of size in this most common species are very observable in the living birds. Picking out a large and a small one, the former measured 17¾ in. by 2 ft. 8 in.; wing 11 in., and tail 7½ in.: the latter gave 15 in. by 2 ft. 5 in.; wing 9½ in., and tail 5¾ in.

No. 63. Latham terms this *Corvus rufus*, and rightly assigns to it one of its Bengalee names, derived from its note; but I think it is more commonly styled *Takka-chore*, or "*Rupee-thief*."

Nos. 64 and 65. *Gracula indica* inhabits Southern India, and is the *Gr. religiosa* of Mr. Jerdon's list. *Gr. religiosa vera* inhabits the hilly parts of Bengal, and is common in Nepal and in the countries eastward of the bay.

No. 70. Mr. Jerdon's *Pastor malabaricus* is probably the *P. dominicanus*, apud Lesson, in the Zoology of M. Bélanger's 'Voyage': vide J. A. S. B. no. 9. for a notice of the Indian Mynahs and some additional species.

[My genus *Trichastoma* certainly appears to be identical with Mr. Eyton's *Malacopteron*, and my *Tr. affine* is probably his *M. cinereus*;

but *Tr. rostratum* must be distinct from *M. magnum*, and I have other members of this group which will require subgeneric division.]

No. 74. *Malacocercus terricolor* is badly figured by Edwards, pl. 184, on which was founded *Turdus canorus* of Linnæus, a name which really cannot stand, as a more thoroughly songless bird does not exist; what cries it has are particularly harsh and chattering—*atch, atch, atch.* The name *Baniahbou* (given it by Buffon) refers to the black-headed oriole, this being called *Saat bhye* (seven brothers), as they always go in families; and *Chatarhæa* (though it is not the *Chatarhæa* of Franklin), which is a much smaller bird, more striated, and having a longer and more graduated tail.

No. 74 *a*. Add *Malacocercus Earlei*, nobis.

No. 75 *a*. My friend Mr. Frith, a most accurate observer, assures me that *Timalia pileata*, Horsfield, is to be met with. Mr. Hodgson has sent it from Nepal, and it is included in Dr. M'Clelland's catalogue of the birds procured by him in Assam.

No. 76. Several common Taylor-birds were brought me the other day, on the authority of which I can now safely assert that the *Orthotomus sepium* of Sykes is merely the young of *O. longicauda* (his *O. Benneti*).

No. 76 *a*. *Prinia inornata* is common in grass-jungle and reeds, and it occurs also in Nepal. This and other Indian *Priniæ* are decidedly congeneric with the *Drymoicæ* (Sw.) of Dr. A. Smith's 'South African Zoology.'

No. 76 *b*. *Prinia flaviventris* is obtained within a short distance of this place. This is the *Orthotomus flaviventris* of Delessert, and I suspect *Motacilla olivacea* of Raffles; I had previously received it from Singapore and Tenasserim.

No. 77. *Iöra tiphia*; distinct both from *I. zeylonica* of Southern India, and from *I. scapularis* of the Malay countries. In reply to Mr. Strickland's request, I may briefly remark that the anatomy of this bird is on the usual passerine type: its food small insects, which it constantly seeks among the foliage and small twigs of trees, where it is ever in motion, attracting attention by its lively yellow colour, and more so by the great variety of its notes; these latter are much as in the *Pari*, and are so various as not unfrequently to occasion disappointment to the ornithologist, who had been thus led to suspect the presence of some unusual species; but its only proper song-note is a very peculiar one, whence is derived one of the native appellations of the bird—*futtēēkjou*, the second syllable of this being excessively prolonged. The nest is a beautiful structure, one before me being of a cup-shape, resting upon and bound to a twig of guava, from which a slight stem branches off obliquely upward on one side, and the base of this is bound into the lower half of the nest; the rim and cupped portion are surprisingly thin, but still very compact, the nest being chiefly constructed of fine cocoa-nut fibres, which form the interior lining, whilst the outside is bound and fastened with a profusion of delicate webs of leaf-rolling caterpillars and spiders: the eggs I have not seen. This genus is undoubtedly very isolated in

its affinities; but it certainly belongs to the great and much-varied *Timalia* series*.

No. 78 *a*. *Turdus unicolor*, Gould, must be added to the list, as I have obtained two specimens in this neighbourhood. I have extensive materials on hand for a monograph on Indian Thrushes.

No. 79. The specific name *rubecula* was a slip of the pen on my part for *citrina*, though the former name is also erroneously included in the list of Assamese birds collected by Dr. M'Clelland. This species is the *Turdus Macei* of Vieillot, and also (as Mr. Jerdon informs me) the *T. albonotatus*, Cuvier.

No. 81. Of a number of Dhyals received from Singapore, I can perceive no difference from the Bengal bird in the male sex, but the females have a black head and back, nearly as deep as in the males, whereas in the Bengal females the upper parts are always ash-gray. Mr. Swainson has subdivided the *saularis* into two or three species.

No. 82. In connexion with the Shahmour, I may notice the nightingale, termed *Bulbul Bhostah*, which is imported from the countries west of the Indus, and many are kept by some of the wealthy baboos, who purchase them at an enormous price. These are carried about by their servants of a morning, according to native custom, and for these two or three months past some eight or ten have been thus daily brought to the fish-bazar, in cages wrapped round and round with cloth, where the incessant noise and clamour excite them to sing: the note I at once recognised, of course, though it scarcely seems to be equal to that of our English nightingale; but I had some trouble to obtain a sight of one of the captives, and then only *by main force*, when through the darkened cage I could perceive clearly enough that the bird was a true nightingale, and as far as I could make out, it was the British species, but of this I will not be positive†. An ornithologist will, I am sure, appreciate the annoyance of continually hearing the note of some fine song-bird in a closely covered cage, and to be constantly refused a sight of it; to have *hookum nai* ("no orders") as the invariable reply to your most civil requests to be allowed to view it: there remained but one practicable alternative, and of that I availed myself; the bird proving to be so perfectly tame and void of fear that there was no occasion whatever for covering it over; but it is the custom to do so, and that is sufficient reason to a Bengalee.

Nos. 84 to 88. Eight species of this group have been described by

* I am rather disposed to place *Iöra* among the *Oriolinæ*. The form of the beak and feet, and the disposition of the colours, are very similar to those of *Oriolus*, and Dr. Horsfield has lately obtained a new *Iöra* equal in size to the small *Oriolus xanthonotus*. This view is now confirmed by the interesting account given by Mr. Blyth of the nidification of *Iöra*. Mr. Jerdon has given me a similar account of *I. zeylonica*: he says it lays four eggs, pale reddish, with darker spots like those of *Hæmatornis* (*Pycnonotus*), and its chief food is spiders.—H. E. S.

† Since writing the above, I have looked at another, which I could see to more advantage; the bird sung lustily all the while, and it decidedly appeared to be the British species.

me in J. A. S. B. no. 59. p. 963 *et seq.* as occurring in the vicinity of Calcutta.

No. 88 *a*. I have just procured a second specimen of *Phylloscopus nitidus*, so that I have now confirmed all my described new species of this genus on a plurality of specimens.

No. 90 *a*. Add a smaller species of *Acrocephalus*, allied to *A. montanus*, and which I believe is the *Sylvia rama* of Sykes.

Nos. 92 and 93. These are species of true *Sphenura*, vel *Dasyornis*. Of *Sph. colluriceps* I have recently obtained two fine specimens, and Mr. Jerdon has procured additional examples of *Sph. striata*. These birds frequent the densest grass-jungle, and Mr. Frith has well suggested to me that the remarkable firm and elastic antorbital bristles are designed to protect the eyes when the bird is pushing its way through the grass-stems. This intent is, indeed, obvious enough when once suggested.

No. 95. This, with some allied species, now constitutes my genus *Cyornis*, of which I know four Indian representatives, viz. *C. rubeculoides*, *C. banyumas*, *C. Tickelliæ**, nobis (*Muscicapa hyacintha*, apud Tickell), and *C. unicolor*, nobis.

No. 97. Add *Muscicapa bilineata*, Lesson, to the synonyms of this species.

No. 98 is, I now think, the true *Saxicola rubicola*, and no. 99 also occurs in this neighbourhood.

No. 99 *a*. A splendid living specimen of *Orocetes cinclorhyncha* was brought to me, and kept some time in a cage, when the carelessness of a servant suffered it to escape. It was impossible to look at this beautiful bird alive without being convinced of its close affinity to the Stone-chats, and not to the *Petrocinclæ*; and with the Saxicoline birds it must be arranged. In this neighbourhood it seems to be a rare and accidental bird.

No. 101. Respecting *Muscipeta paradisi*, I have to observe that both sexes are rufous, with short tails, and merely an indication of the black hood, in nestling plumage; that during the following year both sexes continue rufous, with the crested black hood, the male being already distinguished by its lengthened middle tail-feathers; that after this the males, I think generally, but the females not until a later period, assume the white dress, wherein the sexes are still distinguished by the difference of tail. I am informed that the males breed in the rufous plumage, and I have repeatedly seen a white male paired with a rufous female: white females are indeed rare; and I possess one specimen of this sex with rufous upper-parts and white under-parts, which however is not moulting, but had thrown out this parti-coloured plumage at its last change: a similar parti-coloured male is figured by Mr. Jerdon in the first number of his 'Illustrations of Indian Ornithology,' published a few weeks ago.

* I have described this species as *C. Tickelliæ*, but I now suspect that the *Muscicapa rubecula*, Sw. (Nat. Libr., *Flycatchers*), is the female of this one rather than of *C. banyumas*, in which case the name *rubecula* must be retained for it.

No. 104. I have procured but one more example of *Cryptolopha poiocephala*.

No. 109. *Graucalus papuensis* of India generally and the Malay countries (*Ceblepyris javensis*, Horsfield, and *Gr. nipalensis*, Hodgson) certainly appears to accord with Latham's description of the *Papuan Crow*, excepting that the loral region is not black, but merely of a darker ash-colour than the rest. Length about 12 inches, of wing $6\frac{1}{4}$ to $6\frac{1}{2}$ in., and of tail 5 to $5\frac{1}{2}$ in. Although, in the few cases which I have examined, the females have been distinguished by having the under-parts transversely striated from the throat, yet I have received two or three skins marked as female which had the lower parts as in the male. Of several specimens before me, none equals the dimensions of those assigned by Mr. Hodgson, though I have received specimens from him marked as *nipalensis*, which were perfectly identical in species with those of Bengal, Southern India, &c.

No. 111. *Lalage Sykesi*, as described by Mr. Strickland, is the adult male of the species referred by Mr. Jerdon and myself, after Col. Sykes, to *Ceblepyris fimbriatus* *. No. 110 should also probably be placed as a *Lalage*, but the divisions of this group do not appear to be generally well-defined.

No. 112. Mr. Strickland is right in his identification of this shrike, which is also the *L. phœnicurus* of India, apud Latham, and his *L. lucionensis*, *L. melanotis*, Valenciennes, *L. ferrugiceps*, Hodgson; and it is further noticed by Latham as the "*Curcutia*, said to be found about Calcutta, making a harsh noise," as mentioned in his account of *L. rufus*. Mr. Swainson erroneously refers the *L. erythronotus*, Vigors, to *L. superciliosus*. The latter is described to inhabit Java as well as India, and Raffles includes it in his catalogue of Sumatran birds; I have also received it from Singapore, where, however, another species with analogous plumage appears to be more common, the *L. magnirostris* of Lesson (Bel. Voy.), v. *L. strigatus*, Eyton †.

Two other species are met with in this vicinity, the *L. antiguanus*,

* If my *Lalage Sykesi* be the male of the *Ceblepyris fimbriatus* of Sykes, Jerdon and Blyth, the latter name must be incorrectly used. In my specimens of what I consider the true *C. fimbriatus* of Temminck, the wing is 4 inches 8 lines long, while in *L. Sykesi* it is 4 inches 1 line. Moreover my *C. fimbriatus* has the *rump-feathers spiny*, proving it to be a true *Campephaga*, while in *L. Sykesi* they are *soft*, which was my chief reason for placing it in the genus *Lalage*.—H. E. S.

† I formerly supposed with Mr. Blyth that the *Lanius lucionensis*, Linn., from the Philippine Islands, the *L. superciliosus*, Lath., from the Malay countries, and the *L. cristatus*, Linn., from Bengal, were one and the same; but having now obtained specimens from all these countries, I find that these form three distinct though closely allied species. *L. lucionensis* has the front gray, passing into grayish-brown on the crown and rich rufous-brown on the back and tail; *L. superciliosus* has the front white, the crown and upper parts rufous, and is I presume the *L. magnirostris* of Bélanger, but I cannot at the moment refer to his work; *L. cristatus* has the whole front and upper parts rufous, and a smaller beak than the other two; it must I suppose be called *melanotis*, the name *cristatus* being "likely to propagate an important error."—H. E. S.

Latham (v. *nigriceps*, Franklin, v. *tricolor*, Hodgson, and *Indian Shrike*, Latham), and *L. tephronotus*, Vigors (v. *nipalensis*, Hodgson, and *Grey-backed Shrike* of Latham).

No. 115. This is *Ocypterus leucorhynchos* of Mr. Jerdon's catalogue, and also the Assamese *leucorhynchos* of Messrs. M'Clelland and Horsfield.

No. 116. *Chibia hottentotta*, v. *Cometes krishna*; the former specific name, according to Mr. Strickland, being "expressive of its black plumage;" the Hottentots, however, are not a black race; and the name (of which Mr. Martin failed to learn the derivation) is evidently a corruption of *heiden-staat*, the Dutch equivalent for "heathen state*." *Corvus hottentottus* is also stated to have been observed by Thunberg in Caffraria, which, if true, indicates another meaning for the specific name; but the description certainly applies to the young of the Indian species.

With respect to the other Indian Drongos, there is no difficulty about the birds themselves, but only as regards their synonymy. I have endeavoured to reduce this in J. A. S. B. xi. 799 *et seq.*, to which I have subsequently added, that *D. aëratus*, Stephens, is identical with *æneus*, and that I have received the true *balicassius* from Mr. Hodgson as his *annectens*. But I had not Latham's work to refer to at the time of preparing the *synopsis* of the birds alluded to, and now that it is before me, I will endeavour to advance another step towards their complete determination.

The name *Edolius* I limit to those species which have prolonged stems to their outer rectrices, whereof the twirled extremities are barbed only on the outer side†; the *Bhringa* (subsequently *Melisseus*) *tectirostris* of Hodgson, founded on *E. remifer*, auct., differs considerably from the others, and has the extremities of its outer rectrices barbed on both sides and not twirled. I now think that there are as many as four species of these restricted *Edolii*, for a Singapore specimen without any crest which I saw lately in the possession of a friend, and which is doubtless Gould's *rangoonensis*, appeared to differ from that with a slight frontal crest which I described in J. A. S. B. xi. 172, and of which I figured the bill and forehead in the plate annexed to p. 802 of the same volume; but on sending for my friend's specimen to compare it with that in the museum, I regret to learn that he has shipped it for France. The following appears to me to be the synonymy of the species.

* Such at least is the opinion of a friend, tolerably well versed in philology; but another friend of mine, who is familiar with the Dutch language, will not admit it; and referring to the 'Encyclopædia Britannica,' I find it remarked, that "The natives of this country are called *Hottentots*, in their own language; a word of which it is vain to inquire the meaning, since the language of this country can scarce be learned by any other nation."

† This is not quite correct; the long webs are on the *inner*, not the *outer* side. Moreover *both* sides of these feathers are furnished with webs, though the external ones are very short. These species should therefore be placed in the same genus as *Bhringa remifer*; and as Cuvier's name *Edolius* cannot be retained (being a mere synonym of *Dicrurus*, Vieill.), the term *Bhringa* should be extended to all these *racket-tailed Dicrurinæ*.—H. E. S.

1. *E. grandis*, Gould; *malabaricus*, Shaw and Stephens, and *as figured* by Latham, doubtless from Lady Impey's drawing described by him; *malabaroides*, Hodgson; and perhaps, rather than the next, the *Cuculus paradiseus*, Linn. Nepal, Tenasserim.

2. *E. paradiseus* ? (Linn.); *retifer*, Tem.; *platurus*, Vieillot; *malabaricus*, Gould; *cristatellus*, nobis; Assamese *grandis*, apud Horsfield, as identified from Dr. M'Clelland's drawing of the specimen. Bengal, Southern India, Tenasserim. From Nepal I have only seen the preceding species*.

3. *E. rangoonensis*, apud nos. Tenasserim.

4. *E. rangoonensis*, Gould; perhaps the *Malabar Shrike* or *Drongo* of Sonnerat and Buffon, but a crestless species remains to be verified as inhabiting Southern India. Rangoon, Singapore.

Of *Bhringa* (subsequently *Melisseus*), Hodgson, I know only—

Bhr. remifer (Tem.); *tectirostris*, Hodgson; Assamese *rangoonensis* (?), apud Horsfield. Himalaya, Assam.

Next to this might be placed the *Chaptia* (since *Prepopterus*), Hodgson, founded on—

Ch. æneus (Vieillot); *aëratus*, Stephens; *muscipetoides*, Hodgson; *Butchanga* of the Bengalees, a name which Mr. Hodgson assigns to the Bengal *Fingah*; *Bronzed Shrike* of Latham. India generally.

There now remain the restricted *Dicruri*, of which I am well acquainted with four Indian species.

1. *D. balicassius* (Linn.); Javanese *forficatus* (?), apud Horsfield; *annectens*, Hodgson. Bill more crow-like than in the others, and tail much less deeply forked. Malay countries, Nepal.

2. *D. indicus*, Stephens; *albirictus*, Hodgson, figured by him in As. Res. xviii. pl. 2; *Fingah* of the Bengalees; Indian *balicassius*, auctorum: the beak of this species is much more shrike-like than in the others. India generally, being everywhere the most common species †.

3. *D. macrocercus*, Vieillot; *biloba*, Licht. (if these names should not be rather referred to the preceding species, both having the tail equally forked in fine specimens; perhaps also *cineraceus*, Horsfield, of Java, and *leucophæus*, Vieillot, of Ceylon, founded on the *Drongri* of Levaillant, as very ashy specimens are not unfrequent); *Neel Fingah* of the Bengalees. About the same size as the preceding,

* The *Cuculus paradiseus* of Linnæus is founded on a description by Brisson of a bird from Siam with a *short crest*, measuring, according to Brisson's figure, *one inch* from its extremity to the base of the beak. There is therefore no doubt that this is the *cristatellus* of Mr. Blyth. I should rather doubt the distinctness of the *rangoonensis* of Mr. Gould from that of Mr. Blyth: they may perhaps be different ages of the same bird.—H. E. S.

† Mr. Blyth's second species is certainly the *Drongolon* of Levaillant, the basis of *macrocercus*, Vieillot, *bilobus*, Licht., and *indicus*, Steph., and Vieillot's specific name must be used for it. Mr. Blyth's third species is not *cineraceus* of Dr. Horsfield (as that bird is uniform pale cinereous), and it is probably not the *leucophæus*, Vieill. (*ceylonensis*, Steph., *cinereus*, Swains.), as that is described as wholly silvery gray, and is therefore probably the same as *cineraceus*, Horsf. Should this be so, Mr. Blyth's third species will require a new specific name.—H. E. S.

but readily distinguished from it by the ashy tinge of its plumage, especially on the under-parts, which have never much dark gloss, and often scarcely a trace of it (whereas in the two preceding the gloss is very nearly as bright below as above); likewise by the shape of the beak, which is much less shrike-like, being less strongly and abruptly hooked at tip, also much less compressed, with the ridge of the upper mandible distinctly angulated, instead of being obtusely rounded; and the tarsi are shorter, scarcely exceeding five-eighths of an inch. Irides bright brownish red. Inhabits Bengal, Nepal and Southern India.

4. *D. cærulescens*, apud Jerdon, and of myself, *ante*. This is the true *Lanius cærulescens* of Linnæus, founded on pl. 56 of Edwards's birds*. Distinguished from the last species by its inferior size, and by always having the belly, vent and lower tail-coverts pure white, not merely tipped with white as in the immature plumage of the rest. Structure and colouring in other respects precisely as in the last species, and irides also the same. Length of wing $4\frac{3}{4}$ to 5 inches; of middle tail-feathers 4 in., and outermost (in a particularly fine specimen) $1\frac{1}{2}$ in. more, being generally less. I have only obtained two specimens of this bird here, but have received it from Bengal and Central India, and Mr. Jerdon meets with it in the south. It is obviously distinct as a species.

Of these four *Dicruri*, I have forwarded specimens to the India-house. The *D. leucogaster*, Vieillot, vel *albiventris*, Stephens (a name that would apply excellently to no. 4), founded on the *Drongri à ventre blanc* of Levaillant, said to have "all the under-parts, from chin to vent, white," and to inhabit Batavia, requires, I think, verification; and *D. viridescens*, Gould, is a good species, inhabiting the Indo-Chinese and probably the Malay countries.

No. 122. *Pycnonotus hæmorrhousa*, v. *Ixos pseudocafer*, nobis, *passim*, is also common in Arracan. I have a considerable number of Bulbuls to determine, several being evidently new; but the classification of them is far from being easy. The common Bengal species, which I have regarded as *cafer*, resembles *hæmorrhousa*, except in its larger size, in having the nape and entire breast black, and the back also darker. It measures $9\frac{1}{2}$ inches by $12\frac{1}{2}$ in.; wing 4 in., and tail the same or nearly so†.

No. 124. Mr. Strickland is right in supposing this to be the species figured by Gould as *Pitta brachyura*; it being the *Corvus brachyurus*, var. B and var. F of Latham, and also, as I fully suspect, the *P. abdominalis*, Wagler; while the Linnæan bird I conceive to be also Latham's var. E, described from Sonnerat, *P. malaccensis*, Scopoli, &c., a common Malayan species extending northward to Arracan, and which has always a black chin. For some descriptions of *Pittæ*, vide J. A. S. B. no. 59. n. s. p. 960 *et seq.*‡

* It is also the *Lanius fingah* of Shaw, which is founded on the same plate of Edwards.—H. E. S.

† It hence appears that the *cafer* of Bengal is identical with that of South Africa.—H. E. S.

‡ Several species of *Pitta* are here confounded:—1. The true *Corvus bra-*

No. 126. The bird here referred to, *Oriolus galbula*, is, I am now satisfied, the young male *O. kundoo*, as I have received specimens from Central India precisely similar in colouring which were decidedly that species. The Bengal example referred to has imperfect wings and tail, or the dimensions of the former would have proved it to be distinct from *O. galbula*. It is still the only example of the species which I have met with here, though others have been sent me from Midnapore. In a notice which I gave of the Asiatic species of this genus in J. A. S. B. two corrections are necessary, the *O. acrorhynchus*, Vigors, being distinct from *O. chinensis*, and the *O. castanopterus*, nobis, being merely the second plumage of *O. leucogaster*, v. *xanthonotus*.

[To be continued.]

PROCEEDINGS OF LEARNED SOCIETIES.

LINNÆAN SOCIETY.

March 5, 1844.—E. Forster, Esq., V.P., in the Chair.

Read a paper "On *Spiranthes gemmipara*." By Charles Cardale Babington, Esq., M.A., F.L.S., F.G.S. &c.

Two specimens of this very rare plant were first found by Mr. James Drummond in or about the year 1810, near Castletown, Bearhaven, in the county of Cork, "opposite the western redoubt, growing in a salt-marsh near the shore." One of these was communicated to Sir James E. Smith, who published it in his 'English Flora' under the name of *Neottia gemmipara*, with a description furnished by Mr. Drummond. Within these few years the plant has been again discovered near to, but probably not in exactly the original spot, by Dr. P. A. Armstrong, who on the 30th of September 1843 conducted Mr. Babington and Mr. E. Winterbottom to the station, where they saw about twelve specimens, several of which had been destroyed by cattle, and all were in rather an advanced state of flowering.

From the specimens then collected Mr. Babington gives a detailed description of the plant, which differs in a slight degree from that furnished to Sir J. E. Smith by Mr. Drummond. He thinks it may fairly be referred to the genus *Spiranthes*, although differing from the other European species in some particulars; the most remarkable of these differences consisting in the connexion of all the sepals with

chyurus of Linnæus (founded on *Turdus viridis moluccensis* of Brisson), with throat black and lower parts fulvous, from the Moluccas; 2. the "common Malayan species which has always a black chin" is probably *P. cucullata*, figured in the last Number of the 'Annals'; 3. *Pitta brachyura* of Gould, with a black beak and white throat, from the Himalaya and Bengal, and which wants a specific name; 4. a species with yellowish beak, white throat, and a white or bluish-white streak over the eye: this is the *P. malaccensis* (Scop.) (*superciliaris*, Wagl.), founded on Sonn. 'Voy. Ind.' pl. 110, and is also the *abdominalis*, Wagl., founded on Edwards, pl. 324.—H. E. S.

the two lateral petals. The difference in habit is considerable in consequence of the great density of the spike, and the arrangement of the flowers in three spiral lines*.

A notice of a specimen of this plant, exhibited before the Society on the 7th of February 1843, by the Rev. William Hincks, F.L.S. &c., will be found at p. 462 of vol. xi. of this Journal.

Read also a continuation of Mr. Griffith's memoir, comprehending the parts relating to *Cytinus* and to *Mystropetalon*.

March 19.—E. Forster, Esq., V.P., in the Chair.

Read the commencement of a "Monograph on the Class *Myriapoda*, Order *Chilopoda*; with observations on the general arrangement of the *Articulata*." By George Newport, Esq., Fellow of the Royal College of Surgeons, President of the Entomological Society, &c. Communicated by the Secretary.

April 2.—R. Brown, Esq., V.P., in the Chair.

Read a continuation of Mr. Newport's "Monograph on the *Myriapoda Chilopoda*."

April 16.—E. Forster, Esq., V.P., in the Chair.

Read the conclusion of Mr. Newport's "Monograph on the *Myriapoda Chilopoda*."

Mr. Newport commences his memoir by remarking on the smaller degree of attention which has been paid to *Myriapoda* than to any other class of *Articulata*. His inability, from this circumstance, satisfactorily to identify the specimens in the anatomical examination of which he was engaged, induced him to undertake a complete revision of the class, as far as the materials within his reach, and contained in the cabinets of the Rev. F. W. Hope, the British Museum, the United Service Museum, that of the Zoological Society, and in the Linnean and Banksian collections in the possession of the Society, would admit.

After passing in review the characters of the class, and noticing the different views of authors with respect to its classification as a whole, Mr. Newport enters at length into the reasons which induce him, in accordance with Leach, Latreille and others, and in opposition to Professor Brandt, to separate the *Myriapoda* from true insects, and to place them, as a class, immediately before the *Annelida*.

He details his motives for preferring, with reference to the classification of the *Invertebrata*, a system founded on the skeleton and organs of locomotion, together with the nervous system, to that which is usually adopted, based on the organs of nutrition. Guided by these views he proposes to place the sub-kingdom *Articulata* at the head of the *Invertebrata*, and (following in the steps of our distinguished countrymen Kirby and Spence) to commence with the Hexapods or true Insects, placing after these the Octopods or *Arach-*

* In a subsequent communication Mr. Babington states that he has identified the Irish plant with specimens of *Spiranthes cernua*, Rich., from North America, in the herbarium of Sir W. J. Hooker.

nida, and the Decapods or *Crustacea*, to be followed by the *Myriapoda*, the *Annelida*, and the remainder of the *Articulata*.

The more important objections to this mode of arrangement are considered and answered; and the author next proceeds to examine the division of the *Myriapoda* into tribes and genera, on which subject he agrees, to a considerable extent, with Professor Brandt, whose plan he has followed closely in the formation of the families, sections and genera, and in the characters assigned to them, but whose division of the class into masticating and sucking *Myriapoda* he has been unable to adopt. The following is a synoptic table of the genera of the whole class:—

Class MYRIAPODA, *Leach.*

Ord. 1. CHILOPODA, *Latr.*—Caput latum, prominens. Corporis segmenta inæqualia; singula par unicum pedum ad segmentorum latera insertorum gerentia. Mandibulæ prominentes, acutæ, falciformes. Organorum sexualium apertura ad extremitatem analem.

Trib. 1. SCHIZOTARSIA, *Brandt.*—Antennæ pluri-articulatæ, graciles, corpore longiores. Tarsi longi, pluri-articulati, inæquales. Oculi compositi, prominentes, globosi.

Fam. 1. *Cermatiidæ*, Leach.—Scuta dorsalia 8; singula segmenta 2 ventralia obtegentia. Stigmata mediana.

Gen. 1. Cermatia, *Illig.*—Oculi prominentes. Caput transversum. Scuta dorsalia emarginata. Stomatum latera incrassata.

Trib. 2. HOLOTARSIA, *Brandt.*—Tarsi 3-articulati. Caput e segmentis 2 mobilibus efformatum. Antennæ corpore haud longiores, setaceæ vel filiformes, 14—60-articulatæ. Oculi stemmatosi, aggregati, simplices vel nulli.

Fam. 2. *Lithobiidæ*, Newp.—Scuta dorsalia 15, subquadrata, inæqualia; angulis elongatis, acutis. Coxæ posteriores excavationibus ovatis.

Gen. 2. Lithobius, *Leach.*—Ocelli numerosi. Caput latum, depressum. Labrum denticulatum.

Gen. 3. Henicops, *Newp.*—Segmentum cephalicum latum; ocellorum pari unico.

Fam. 3. *Scolopendridæ*, Leach.—Segmenta podophora 21 vel 23. Pedes posteriores incrassati; articulo primo vel secundo spinoso.

Gen. 4. Scolopendra, *L.*—Segmentum cephalicum cordatum, imbricatum. Ocellorum paria 4. Spiraculorum valvularium paria 9.

Gen. 5. Cormocephalus, *Newp.*—Segmentum cephalicum posticè truncatum. Spiracula valvularia.

Gen. 6. Rhombocephalus, *Newp.*—Segmentum cephalicum basilareque rhomboidea. Labium angustatum.

Gen. 7. Heterostoma, *Newp.*—Segmentum cephalicum truncatum. Dentes magni. Spiracula cribriformia, in paribus 10.

Gen. 8. Scolopendropsis, *Brandt.*—Segmentum cephalicum truncatum. Pedum paria 23.

Gen. 9. Theatops, *Newp.*—Ocelli distincti. Antennæ 17-

articulatæ, subulatæ. Pedes posteriores clavati. Labium dentatum.

Gen. 10. Cryptops, *Leach.*—Ocelli nulli vel absconditi. Antennæ 17-articulatæ. Labium haud denticulatum.

Fam. 4. *Geophilidæ*, Leach.—Segmenta subæqualia, singula e subsegmentis 2 completis sed inæqualibus efformata. Segmentum anale pedibus brevibus styliformibus.

Subfam. 1. *Scolopendrellinæ*, Newp.—Corpus breve, crassum. Antennæ 14—20-articulatæ.

Gen. 11. Scolopendrella, *Gervais.*—Pedum paria 10. Antennæ moniliformes, 14—20-articulatæ.

Subfam. 2. *Geophilinæ*, Newp.—Segmenta numerosa. Antennæ 14-articulatæ.

Gen. 12. Mecistocephalus, *Newp.*—Segmentum cephalicum angustissimum, elongatum. Corpus attenuatum. Labium latum, integrum.

Gen. 13. Arthronomalus, *Newp.*—Segmentum cephalicum subquadratum. Antennarum articuli inæquales. Labium angustum, emarginatum.

Gen. 14. Gonibregmatus, *Newp.*—Segmentum cephalicum cordiforme, acutum. Antennæ filiformes. Corpus lineare.

Gen. 15. Geophilus, *Leach.*—Caput subtriangulare. Corpus depressum, gradatim incrassatum. Segmenta pedesque numerosi.

Ord. 2. CHILOGNATHA, *Latr.*—Caput verticale, rotundatum; mandibulæ crassæ, robustæ, vel cum labio coalitæ et elongatæ; segmenta numerosa. Corporis segmenta inæqualia. Pedes superficiei ventrali affixi. Organorum sexualium aperturæ in segmenti 4ti et 7mi superficie ventrali.

Trib. 3. PENTAZONIA, *Brandt.*—Corpus ovale, in globum contractile, dorso valdè convexo, ventre complanato. Pedes laminis liberis mobilibus affixi.

Fam. 5. *Glomeridæ*, Leach.—Corpus læve, in globum contractile. Oculi distincti.

Gen. 16. Glomeris, *Latr.*—Ocelli 8, in lineâ laterali curvatâ. Segmenta 13. Pedum paria 17.

Gen. 17. Zephronia, *Gray.*—Ocelli numerosi, aggregati. Antennæ 6—7-articulatæ, clavatæ. Pedum paria 21.

Gen. 18. Sphærotherium, *Brandt.*—Ocelli aggregati. Antennæ 7-articulatæ, clavatæ. Pedum paria 21.

Trib. 4. MONOZONIA, *Brandt.*—Corpus vermiforme, elongatum. Segmenti singuli dimidia pars anterior cylindrica, posterior lateribus dilatata; laminâ ventrali duplici coalitâ pedum paria 2 gerenti.

Fam. 6. *Polyxenidæ*, Newp.—Caput arcuatum, prominens. Corpus latum. Pedes attenuati; coxis maximis. Segmentum anale fasciculis longis.

Gen. 19. Polyxenus, *Latr.*—Corpus breve, squamis parvis penicillatis vestitum. Pedum paria 13.

Fam. 7. *Polydesmidæ*, Leach.

Subfam. 1. *Polydesminæ*, Newp. Oculi nulli vel obscuri.

Gen. 20. Fontaria, *Gray.*—Corpus convexum. Segmenta imbricata; laminis lateralibus deflexis.

Gen. 21. Polydesmus, *Latr.*—Corpus depressum, subconvexum; laminis lateralibus horizontalibus.

Gen. 22. Strongylosoma, *Brandt.*—Corpus cylindricum. Segmenta tumida; laminis lateralibus rotundatis subnullis.

Subfam. 2. *Craspedosominæ*, Newp. Oculi distincti.

Gen. 23. Craspedosoma, *Leach.*—Ocelli numerosi, aggregati. Corpus depressum; laminis lateralibus prominentibus.

Gen. 24. Platydesmus, *Lucas.*—Ocelli duo, magni, prominentes. Corpus depressum; laminis lateralibus prominentibus.

Gen. 25. Cambala, *Gray.*—Ocelli serie simplici curvatâ. Corpus cylindricum; laminis lateralibus brevissimis, in porcam simplicem desinentibus.

Trib. 5. Bizonia, *Newp.*—Corpus subcylindricum; laminis nullis marginalibus. Antennæ 7-articulatæ, clavatæ. Segmenta numerosa; singula e subsegmentis 2 coalitis efformata, pedumque paria 2 gerentia.

Fam. 8. *Iulidæ*, Leach.—Corpus cylindricum; laminis lateralibus nullis. Segmenta e subsegmentis 2 coalitis efformata.

Subfam. 1. *Synpodopetalinæ*, Newp. Pedes laminis immobilibus affixi.

Gen. 26. Platops, *Newp.*—Caput parvum, complanatum vel concavum. Pedes graciles, elongati. Corpus pyramidale, elongatum.

Gen. 27. Iulus, *L.*—Caput convexum. Corpus cylindricum. Prothoracis latera triangularia. Antennæ elongatæ.

Gen. 28. Unciger, *Brandt.*—Squama inferior analis mucronata. Corpus cylindricum.

Gen. 29. Spirobolus, *Brandt.*—Caput convexum. Oculi subtetragoni. Corpus subpyramidale. Prothoracis latera triangularia. Antennæ breves.

Gen. 30. Spiropœus, *Brandt.*

Gen. 31. Spirocyclistus, *Brandt.*—Antennæ breves. Oculi elongati, triangulares. Thoracis latera brevia, triangularia.

Gen. 32. Spirostreptus, *Brandt.*—Antennæ breves, articulis infundibulatis. Oculi transversi. Prothoracis latera elongata vel dilatata.

Subfam. 2. *Lysiopetalinæ*, Newp. Pedes laminis mobilibus affixi.

Gen. 33. Lysiopetalum, *Brandt.*—Frons dilatata. Pedes laminis liberis mobilibus affixi.

Fam. 9. *Polyzonidæ*, Newp. (Ommatophora, *Brandt*).—Ocelli conspicui, fronti inter antennas in seriebus transversis inserti.

Gen. 34. Polyzonium, *Brandt.*—Ocelli 6 parvi, in seriebus 2 transversis. Corpus depressum.

Gen. 35. Siphonotus, *Brandt.*—Ocelli 2, in serie simplici transversâ.

Fam. 10. *Siphonophoridæ*, Newp. (Typhlogena, *Brandt.*)—Oculi nulli.

Gen. 36. Siphonophora, *Brandt.*—Caput conicum, elongatum. Nutritionis organa rostriformia, elongata.

The author then proceeds to treat at considerable length of the external anatomy of the *Myriapoda*, commencing with the composition and mode of development of the segments and their appendages, and comparing them in these particulars with Insects. The variations in the several genera of *Myriapoda* are particularly noticed; and the principles on which their development, in its various modifications, depends, are elucidated by numerous observations on their mode of growth. The structure and development of the head are next treated of in detail in the different families and genera of the *Chilopoda*; and the organs of nutrition are especially examined with reference to their development and analogies. This branch of the subject is concluded by an appreciation of the relative value of the different parts of the skeleton in furnishing generic and specific characters.

The systematic description of the families, genera and species of the *Myriapoda Chilopoda* completes the memoir; which was accompanied by a series of drawings, illustrative of their external anatomy and generic characters.

ZOOLOGICAL SOCIETY.

Oct. 24, 1843.—William Yarrell, Esq., Vice-President, in the Chair.

Mr. Bridges on the habits, &c. of some of the smaller species of Chilian Rodents.

"*Mus longicaudatus*, Bennett.—I found this mouse in the valley of Quillota, fourteen leagues distant from Valparaiso, in the vicinity of brooks and rivulets, amongst weeds and long grass, although from its appearance I should imagine it seldom takes the water. In that part of Chile it is not rare, but it cannot be considered a common species. In the province of Colchagua I have found another species approaching *M. longicaudatus* and more abundant, differing slightly in the length of its tail, and in being somewhat less in size. At first sight the two species are liable to be confounded. Probably this is the same species mentioned in p. 40 of the 'Zool. of the Voyage of the Beagle' by Mr. Darwin as being so numerous in the province of Concepcion.

"*Mus longipilis*—Waterh., 'Voy. of the Beagle,'—inhabits the provinces of Aconcagua, Valparaiso and Colchagua. Its favourite haunts are the hedges made of bushes of *Mimosa Cavenia* and *Trevoa trinervis*, also other shrubs used indiscriminately for that purpose. It is necessary to explain that the hedges of the fields of Chile are renewed every year by throwing on each side of them new layers of bushes, and that they are frequently two or three yards across, forming thus a mass of decomposing wood, which gives excellent shelter for the

numerous small Rodents inhabiting that country, which is so rich in this interesting group. The *Mus longipilis* is without a native name to distinguish it from the other species found in Chile. All the small species belonging to different families are known and called by the natives by the name of Llaucha, pronounced Yaw-cha, a term in the language of the Auracarian Indians signifying a mouse, and this name is current in the present day in the parts of the country occupied by the descendants of the Spaniards. The general term applied to the large species is 'Ratones.' There is a species found near the town of Quillota, fourteen leagues distant from Valparaiso, and probably not yet known to naturalists, called 'Pericote.' This animal lives in common in the caves with *Octodon Cumingii*.

"*Myopotamus Coypus*, Auct.,—*Mus Coypus*, Molina,—inhabits the margins of rivers and lakes in the southern provinces of Chile, abounding more in the lakes than in the rivers, where the *Typha latifolia* and *Scirpus* species are plentiful to give them shelter. During the time of copulation, which takes place in September and October, the Coypo makes a mournful kind of cry, which somewhat resembles that of a young child. I was once riding along the margins of one of the streams which enters the river Teno in the province of Colchagua, and my attention was roused by a most melancholy sound, which I fancied was from a child in the water, and to my surprise I found it arose from a Coypo seated on a dead stump almost on a level with the water. I could not help listening for a few minutes at the singular noise, till on a sudden, when the Coypo saw me, it disappeared under water. The Coypo possesses a strong attachment for its young, and swims with them on its back till they are sufficiently large to follow the old ones in pursuit of their food. The places where the Coypo most abounds in Chile are the borders of the river Maypo near Santiago, the capital of the country, also in the lakes of 'Aculeo' and Quintero. The natives, especially the husbandmen, use the skin of this animal to make tobacco-pouches.

"*Octodon Cumingii*, Bennett,—*Sciurus Degus*, Molina,—*Dondrobius Degus*, Meyen,—is the most common of all the Chile Rodents. It is found in the hedges of the central provinces of Chile, and may be seen during the day, but more generally in the afternoon. In habits it is tame, and at first sight distinguished from all other species from its activity and by its carrying the tail curved upwards like the mountain *Lagotis* or Viscacha. This little animal has a very extended range: I have seen it as far north as lat. 28°, and in south 35°, and it may probably extend further, but I do not remember seeing it in the provinces of Chiloe or Valdivia. In the province Coquimbo, where hedges do not abound, owing to the sterility of the country, it inhabits rocky situations, living amongst the loose stones on the slopes of mountains; and it is frequently found in the caves or burrows of the Chinchilla. The natives employed in killing the 'Chinchillas,' which are not uncommon about Coquimbo and Huasco, before they commence following the burrows, which they do with crow-bars, examine the dung of the animals about the caves, and from their practical knowledge they distinguish at once if the caves

are inhabited by the Chinchilla or the Octodon. Nevertheless, as both animals often inhabit the same cave, they frequently after great labour find it only occupied by the Octodon. From observations which my long residence in Chile has given me, I am inclined to believe that the *Octodon Cumingii* does not breed more than twice during the year, viz. in spring and autumn, producing from four to six young at a birth. The favourite food of the Octodon is herbage near the hedges: but in the winter months, when pressed by hunger, it feeds on the tender bark of *Mimosa Cavenia*, also that of *Cestrum Palqui*.

"*Schizodon fuscus*—Waterh. 'Proc. Zool. Soc. for November 1841—is found in the Valle de las Cuevas, on the eastern side of the Andes, about six leagues from the slopes of the volcano of Peteroa, at an elevation of from 5—7000 feet, in S. lat. 35°. Its favourite abode is near the mountain streams in grassy situations. There are certain places in the valley completely undermined by the workings of this animal; and whilst we were riding over these districts, our horses frequently plunged almost up to their knees in the burrows. Whilst rambling in search of the beautiful alpine plants I could not help feeling surprise at finding animals of this order in such a locality as those elevated valleys, which are covered with snow at least four months during the year. The question is, do they on the approach of snow-storms migrate towards the verge of the Pampas, or make a provision of dried grass and roots for the winter months? I should give my opinion in favour of the latter, judging from their enormous burrows. The *Schizodon fuscus* is nocturnal like *Poephagomys ater*: those I procured were shot in the evening near the entrances of their caves. I have seen them burrowing and throwing the sand out of their caves during the day; but the moment they hear a noise their labours cease and they retire deeper into their caves.

"*Notice of the new animal allied to Octodon.*—This animal is found in the vicinity of the town of Curico, in the province of Colchagua; it inhabits the hedges made of dead bushes, and does not appear to burrow, like many other species. The present species may be known by the singular chirping or whistling noise which it makes. It forms its nest in the decomposing bushes and sometimes on the surface of the ground, of dried grass, and appears to live in small communities of one or two families. This animal appears to be more rare than many other Rodents, as I have never been able to find it in any other locality, except the one above mentioned.

"*Poephagomys ater*, F. Cuvier; *Mus cyanus*, Molina.—The *Poephagomys ater* is undoubtedly the animal alluded to by Molina under the name *Mus cyanus*; his long description of its habits agrees in most respects with the habits of this little animal; but I have never yet heard it called by the natives 'Guanque': it is generally known in Chile by the name of Cururo and Cuyeita; Guanque is the vernacular name of a species of *Dioscorea* on which the 'Cururo' subsists. Molina is perfectly correct in saying that it stores up a considerable quantity of provisions, which consist of the *Dioscorea*, *Conanthera*, *Ornithogalum*, *Brodiæa*, and other bulbs and tubers which abound in the country. The poorer class of inhabitants being aware of its

habits, sound the caves or burrows, and rob them of their store, which they eat. The jaws of the Cururo are capable of extraordinary expansion, and by this provision of nature it is enabled to carry bulbs and tubers of a large size to its granary.

"The work of this little animal would surprise a person unacquainted with its habits; I have frequently seen a considerable surface of ground completely undermined by its burrows. It generally selects the slopes of hills and mountains, where bulbs are found, especially in the interior parts of the country: its caves are carried in a horizontal course, at the depth of eight or ten inches, or rather about the depth in which they meet their food.

"This little animal may be considered nocturnal, seldom or ever making its appearance during the day; those which I procured were obtained by waiting for them in the evening, and shooting them when their head scarcely emerged from their caves.

"Whilst residing in the elevated valleys of the Andes, on the eastern side, I observed on the dry slopes of the mountains the labours of a Rodent (probably a species of *Ctenomys* or *Poephagomys*) different from any I had previously met with; the chief difference consisted in the mouth of the cave never being left open. Its mode of burrowing is similar to *Poephagomys ater*, in being near the surface; but as I was unfortunately unprovided with traps, I could not obtain one.

"*Lagotis pallipes*, Bennett.—This is the mountain 'Viscacha'; the specimen brought home by me, and now in the British Museum, was taken on the east side of the Andes, at an elevation of 4000 to 5000 feet, between Villavicencia and Uspallata. The specimen alluded to I found soon after sunrise near Uspallata, in a rocky valley; I saw four of these animals feeding on the scanty herbage, and at first took them to be young foxes, but my men assured me to the contrary. I gave my dog in charge of one of the men, so that I might approach them; but, unfortunately, before I got within gunshot the dog got loose. It was amusing to see these animals bound over the rugged and rocky side of the mountain, swinging their beautiful brushy tail and endeavouring to regain the caves in the rock.

"There is a mountain 'Viscacha' on the west side of the Andes, but not having seen it, I am unable to say if it be the *Lagotis pallipes* or another species of the same genus. This animal avails itself of caves in the rock or situations extremely rugged, where large stones lie tumbled one on another, leaving spaces between them sufficiently large to admit the body of the Lagotis.

"*Notice of a new species of Didelphys.*—In looking over the beautiful plates of the 'Zoology of the Voyage of H.M.S. Beagle,' I find three species of *Didelphys* figured, and I feel pleasure in stating that I am acquainted with another species in Chile, inhabiting the province of Colchagua. It is known to the natives by the name of 'Llaca,' pronounced 'Yacu.' In its appearance it resembles *D. elegans*, but is larger in size and possesses an extraordinary fleshy tail. In 1835, whilst some men were taking down a cottage on an estate near Curico, two of those beautiful little animals were found

in the thatch; one was taken alive, and after having it several days in my possession it by some means made its escape. It appears to be rare, although, from its having a native name, it might be imagined to the contrary; I frequently offered a reward to the natives to induce them to obtain another specimen, but never was able to procure one."

Nov. 28.—William Yarrell, Esq., Vice-President, in the Chair.

The following papers were read:—

"Descriptions of new species of the genus *Narica*, discovered by Hugh Cuming, Esq.," by M. Récluz.

Genre Narica, Récluz.

Nerita species, Chemnitz; *Sigaretus* species, Lamarck; genre *Vanicoro*, Quoy et Gaimard olim; *Narica*, Récluz, in litteris; D'Orbigny (Alcide), Moll. Cuba; *Merria*, Gray in Beechey's Voyage.

1. Narica cidaris. *Nar. testâ orbiculato-ovatâ, ventricosâ, anticè dilatatâ, supernè depresso-planâ, solidiusculâ, lacteâ, plicis longitudinalibus anticè laxioribus, subregularibus, lineis elevatis transversis æquidistantibus reticulatâ, scabriusculâ; spirâ prominulâ, semisphæricâ, apice retusâ; aperturâ subrotundâ, patulâ; labio arcuato; umbilico parvo, profundo; canali oblongo, angusto et vix arcuato.*

Hab. "From the island of Masbate, Philippines; found under stones at low water." H. Cuming.

2. Narica ligata. *Nar. testâ ventricoso-ovatâ, tenuiusculâ, albâ, longitudinaliter supernèque tenuiter plicatâ, lineis transversis elevatis intermediis minoribus ligatâ; spirâ prominenti, rotundatâ, radiatim plicatâ, apice obtusiusculâ; aperturâ subrotundâ, parvâ; umbilico pervio, spirali, profundo, latiusculo; canali brevi, largo; columellâ subrectâ, medio ad basim arcuatim rotundato.*

Hab. "From Catanuam, province of Tayabas, isle of Luzon; found under stones at low water." H. Cuming.

3. Narica Deshayesiana. *Nar. testâ ventricoso-globosâ, tenui, fragili, subepidermide lutescente tenuissimâ exalbidâ sive albâ, læviter ac creberrimè transversim striatâ; anfractibus subsenis, supernè rotundatis, longitudinaliter argutè plicatis: plicis in ultimo posticè validis, remotiusculis, anticam partem versùs evanescentibus; spirâ semirotundâ, angustè plicatâ, subacutâ; aperturâ subsemilunari; umbilico magno, patulo; canali semilunari ad sinistram et internè carinato, externè radiatim profundè ac eleganter plicato; columellâ intus et ad basim sinuatâ.*

Var. β. *Testâ ventricoso-ovatâ, subglobosâ, plicis obsoletis; infimo anfractu angustiore.*

Hab. "From St. Nicholas, island of Zebu, Philippines; found under stones at low water: and var. β from Catanauan, province of Tayabas, isle of Luzon; found under stones at low water." H. Cuming.

4. Narica Petitiana. *Nar. testâ orbiculato-ovatâ seu semiglobosâ, crassâ, albidâ, obliquè et crebrè plicatâ, lineis elevatis transversis,*

irregularibus, angustioribus et remotioribus reticulatâ; anfractibus depresso-rotundatis; spirâ semisphæricâ, obtusatâ, posticè incumbente; radiatim plicatâ; aperturâ subrotundâ, dilatatâ; labio vix arcuato, margine in senioribus externè complanato, submedio vix anguloso; umbilico parvo; canali angusto, elongato, parum arcuato et angulo angusto cincto.

Hab. "From the island of Masbate, Philippines; found under stones at low water with *Narica cidaris*." H. Cuming.

Var. *β. Testâ tenuiore, plicis angustis regulariter dispositis, lineis transversis æquidistantibus clathratâ, scabriusculâ; umbilico magno, profundo, spiraliter contorto; canali latiusculo, profundo, falciformi.*

5. Narica Cumingiana. *Nar. testâ semiglobosâ, ventricosâ, tenuiusculâ, exalbidâ, transversim regulariter sulcatâ, longitudinaliter ac obliquè lineatâ, cancellatâ, scabriusculâ, ad sectiones granulatâ; spirâ prominulâ, suprà planâ, latere carinatâ, sulcis reticulatâ et punctis valdè impressâ; apice posteriori, acuto; aperturâ dilatatâ, semilunari; umbilico profundo, coarctato, canali semilunari-oblongo, extùs annulo acuto cincto; labio supernè tenui, infernè incrassato; labro intùs submarginato.*

Hab. "From Catbalonga, island of Samar, Philippines; found in coarse sand at ten fathoms." H. Cuming.

6. Narica plicata. *Nar. testâ ventricoso-ovatâ, subglobosâ, solidâ, albâ, longitudinaliter grossè plicatâ, lineis elevatis crebrioribus costas decussantibus circumcinctâ; anfractibus supernè depresso-planiusculis; spirâ prominulâ, laterali, subacutâ; aperturâ subrotundâ; umbilico latiusculo, profundo, spirali; canali semilunari, crenulis profundis extùs cincto; columellâ arcuatâ, basi et anticè gibbosiusculâ.*

Hab. "From the island of Ticao; found under stones at low water." H. Cuming.

7. Narica Gueriniana. *Nar. testâ orbiculato-ovatâ, depressâ, subconoideâ, subtùs planâ, crassâ, albido-lutescente, obliquè costatâ; costis rotundatis sulcis majoribus, interdum æqualibus, lineis transversis creberrimis eleganter cinctâ; spirâ semiglobosâ, obtusiusculâ; aperturâ semilunari, patulâ; umbilico profundo, extùs dilatato, in canalem latum, semisphæricum, extùs angulatum explanato; columellâ rectâ, suprà lineâ tenuiter impressâ instructâ.*

Hab. "From the island of Capul, Philippines; found under stones at low water." H. Cuming.

8. Narica distans. *Nar. testâ parvâ, orbiculato-conicâ, tenuiusculâ, pellucidâ, albidâ, costis longitudinalibus obliquis, angustis acutis valdè remotis, regulariter radiatâ, interstitiis sub lente tenuissimè et creberrimè striatis; spirâ exsertiusculâ, gradatâ, conico-acutâ; aperturâ semirotundâ; umbilico dilatato, profundo; canali largo, semicirculari, intùs striato, extùs angulo acuto circumdato.*

Hab. "From Jacna, isle of Bohol, Philippines; found under stones at low water." H. Cuming.

9. Narica rosea. *Nar. testâ minimâ, semiglobosâ, roseâ, tenui,*

striato-cancellatâ, regulariter granosâ ; anfractibus tribus, supernè depresso-planiusculis ; spirâ prominulâ, apice lævi, mammillatâ, rubicundâ ; aperturâ semirotundâ ; columellâ rectiusculâ, albidâ, umbilico largo, extùs in canalem latiusculum, semiorbicularem producto ; labro intùs striato.

Hab. The Moluccas (M. Hardouin-Michelin).

10. Narica granulosa. *Nar. testâ parvâ, semiglobosâ, tenui, subpellucidâ, albâ sive albido-lutescente ; anfractibus supernè planulatis, ferè gradatis, transversim regulariter striato-costatis ; costis angustioribus obliquè striatis ac cancellato-granosis ; spirâ prominulâ, semiglobosâ, acutâ ; aperturâ semirotundâ, vitreâ ; columellâ tenui vix arcuatâ ; umbilico profundo ; canali latiusculo, semicirculari.*

Var. *β. Testâ albo-vitreâ, hyalinâ.*

Hab. The Moluccas and New Holland.

11. Narica Orbignyana. *Nar. testâ ovato-globosâ, crassiusculâ, lacteâ, transversim cingulatâ : cingulis* 5–6 *obtusis, majoribus, lineis longitudinalibus decussantibus, cancellato-granosâ ; spirâ planissimâ, ad peripheriam tricarinatâ : carinis obtusis, infimis majoribus ; apice valdè laterali, acuto, hyalino, lævissimo ; aperturâ ovato-rotundatâ ; columellâ basi crassiusculâ et anticè calloso-gibbâ, supernè tenuissimâ ; umbilico minimo, subclauso ; canali lineari subrecto.*

Coll. M. Récluz.

Hab. New Holland, on the coast of the island Maria.

12. Narica Blainvilleana. *Nar. testâ ovato-globosâ, anticè dilatatâ, striis transversis inæqualibus aratâ, posticè tenuiter plicatâ : plicis anticè obsoletis ; spirâ parvulâ, semisphæricâ, regulariter plicatâ, laterali, apice fuscâ ; aperturâ subrotundâ, lacteâ ; columellâ arcuatâ, basi et intùs subcompressâ ; umbilico profundo, angusto, in canalem semilunarem producto ; labro rotundato, intùs lævissimè striato.*

Hab. The Moluccas.

13. Narica Sigaretiformis. *Nar. testâ globoso-acutâ, tenui, exalbidâ, pellucidâ, fragili ; anfractibus* 5–6 *transversim subtilissimè striatis ; spirâ prominenti, conico-acutâ ; apice elongato, corneo-fusco ; aperturâ semirotundâ ; columellâ tenuissimâ, vix rectâ ; umbilico rotundato, dilatato, profundo, spirali, in canalem subsenis oblongum producto.*

Velutina Sigaretiformis, Potier, Gal. Moll. Mus. Douai, pl. 39. f. 21, 22, *malæ.*

Hab. New Holland.

Prof. Owen read the second and concluding part of his memoir on the *Dinornis* *.

The arrival of the second box of specimens of the bones collected by the Rev. W. Williams in Poverty Bay, New Zealand, which had been placed by Dr. Buckland in Mr. Owen's hands, had enabled him to confirm his former account of the generic characters and ordinal

* See vol. xii. p. 444.

affinities of the apparently extinct *Dinornis*, and also to distinguish remains of five species of that genus.

The bones of the foot, and especially the tarso-metatarsal bone, established three distinct species, the largest of which the author proposed to call *Dinornis giganteus*; the next in point of size he termed *Din. struthioides*, and the third *Din. didiformis*. The common generic characters of the tarso-metatarsi of these species were first pointed out, and then their specific differences of proportion and figure. The maturity of the different-sized bones indicating the above species was demonstrated by reference to the long retention of immature characters in the same bone of existing *Struthionidæ*, and by the fact of a tarso-metatarsal bone of a half-grown *Dinornis giganteus* manifesting the same incomplete coalescence of its primitively distinct elements; showing that the *Dinornis*, like the Ostrich, had a tardy ossification of the skeleton, as compared with birds of flight. The tibiæ were next described; one of these, belonging to a mature bird, established a species smaller than the *Din. didiformis*, and which, from its similarity of stature to the great Bustard (*Otis tarda*), Prof. Owen proposed to call *Dinornis otidiformis*. The largest tibia, belonging to the *Din. giganteus*, presented the extraordinary dimensions of two feet eleven inches. The shaft of a smaller tibia, about two feet long when entire, was referred to the *Din. struthioides*, and there were four entire tibiæ of the *Din. didiformis*. In the series of femora, after the description of the generic characters of the bone, the specimens were pointed out which belonged to the *Dinornithes giganteus, struthioides, didiformis*, and *otidiformis*, and two other entire femora were described and their distinctive characters shown, which indicated, unequivocally in the author's opinion, a fifth species of *Dinornis*, of the size of the Emeu, and which was, therefore, named *Din. dromæoides*.

Three pelves, more or less perfect, and portions of two others, were described, and were referred to the *Din. giganteus, dromæoides*, and *didiformis*. Three cervical and two dorsal vertebræ also indicated three distinct species of *Dinornis*, and all of them presented the common character of unusual strength of the spinous and transverse processes. Comparative dimensions of most of the bones exhibited were given. No part of the skull, sternum, ribs or wing-bones had been transmitted, but Prof. Owen proceeded to point out the physiological grounds for concluding that the development of the anterior extremities must have presented in the *Dinornis* an intermediate condition between that in the Emeu and that in the Apteryx.

The author then gave his calculations, from the analogies of existing Struthious birds, of the height of the different species of *Dinornis*. The largest, *Din. giganteus*, according to the proportions of the Ostrich, must have stood ten feet five inches, but according to those of the Cassowary, nine feet five inches; its average stature might be taken at ten feet. A diagram of the great extinct bird, restored according to these proportions, was exhibited.

The *Dinornis struthioides* was seven feet high, which is the average stature of the *Struthio Camelus*.

The length of the tibia and metatarsus of the *Din. dromæoides* not yet being known, the height of five feet was assigned to it as a probable one; its femur corresponds in size with that of the Emeu, whose average measurement in captivity is between five and six feet.

The height of the *Din. didiformis* was four feet; exceeding, therefore, the extinct Dodo (*Didus ineptus*), but evidently resembling it in its stouter proportions and shorter metatarsus, as compared with the other species of *Dinornis*.

Prof. Owen next proceeded to consider the evidences of tridactyle birds afforded by the impressions in the New Red Sandstone of Connecticut, called 'Ornithichnites,' and having pointed out the proportions of the tarso-metatarsal bone in existing Struthious birds to their foot-prints, indicated thereby the size of the same bone in different *Ornithichnites*, and reciprocally the sizes of the foot-prints of the different *Dinornithes*, from those of their tarso-metatarsal bones.

The two phalanges of the *Dinornis*, which were described and compared in this section of the memoir, afforded pretty clear indications of the form and proportions of the toes in the two species (*giganteus* and *didiformis*) to which they were referred. These data showed that the trifid foot-print of the *Dinornis giganteus* must have exceeded in size the *Ornithichnites giganteus* and *O. ingens* of Prof. Hitchcock, and that the *Din. didiformis* must have left impressions as large as those called *Ornithichnites tuberosus*. The author warned his hearers against inferring identity of species or even genus between the extinct *Struthionidæ* of the alluvium of New Zealand and those of the trias of North America, on account of correspondence of size and number of toes, which the modern genera *Casuarius*, *Rhea*, &c. proved to be insufficient grounds. He concluded by a comparative review of recent and extinct *Struthionidæ*, remarking on their peculiar geographical distribution, on the conditions which favoured the former existence of so rich a development of the family in New Zealand, and on the probable causes of their extermination. Evidence of the recent character of the bones described was afforded by the great proportion of animal matter which they retained, and the details of the analysis of the earthy salts were promised for a future Meeting.

December 12.—William Yarrell, Esq., V.P., in the Chair.

Mr. Gould laid before the Meeting an extensive series of Toucans, and called attention to two species which had not hitherto been characterized, viz.:—

Ramphastos citreolæmus. *Ramp. rostro nigro, vittâ latâ basali, et culmine olivaceo-viridibus, hôc colore gradatim cum flavido apud apicem mandibulæ utriusque se commiscente; ptilose nigrâ; gulâ albâ; pectore sulphureo, vittâ splendidè coccineâ cincto; tectricibus caudæ superioribus sulphureis.*

Bill black, with a very broad basal band, and the culmen of an olive-green, passing into pale yellow on the points of both mandibles, and deepening into orange at the gape; the ridge round the base of the bill black; crown of the head, back of the neck, all the upper surface, wings, tail, breast, abdomen and thighs deep black; throat

white; chest sulphur-yellow, bounded below by a band of rich deep scarlet; upper tail-coverts sulphur-yellow; under tail-coverts rich deep scarlet.

Total length, 21 inches; bill, $5\frac{1}{2}$; wing, $8\frac{1}{4}$; tail, $7\frac{1}{2}$; tarsi, $1\frac{3}{4}$.

Hab. Santa Fé de Bogota.

In the collection of Prince Massena at Paris, and in my own.

Pteroglossus pœcilosternus. *Pt. culmine rostri, strigâ angustâ ad basim mandibulæ superioris; sic et mandibulâ inferiore totâ nigerrimis; mandibulis utrisque ad basim lineâ prominente angustâ aurantiacâ circumdatis; mandibulæ superioris lateribus bellè aurantiacis; capite et guld splendidè nigerrimis; dorso, alis caudâque saturatè viridi-olivaceis; corpore inferiore sulphureo, vittâ pectorali nigrâ, alterâ sanguineâ.*

Culmen, a narrow band down the base of the upper mandible and the whole of the under mandible deep black; narrow elevated ridge surrounding the base of both mandibles orange; sides of the upper mandible beautiful orange, fading into white towards the tip, which is stained with red; head and throat deep glossy black; back, wings and tail dark olive-green; rump and upper tail-coverts rich deep blood-red; all the under surface sulphur-yellow, crossed on the chest by an irregular band of black, and on the breast by another of deep blood-red; the interspaces stained with scarlet; thighs chestnut, each feather slightly fringed with sulphur-yellow.

Total length, 18 inches; bill, $4\frac{1}{4}$; wing, 6; tail, $7\frac{1}{4}$; tarsi, $1\frac{3}{8}$.

Hab. Santa Fé de Bogota.

In the collection of Prince Massena at Paris.

Professor Owen read a communication on the Rudimental Marsupial Bones in the *Thylacinus*:—

The marsupial bones, as bones, do not exist in the Dog-headed Opossum or Hyæna of the Tasmanian colonists (*Thylacinus Harrisii*, Temm.); they are represented by two small, oblong, flattened fibro-cartilages, imbedded in the internal pillars of the abdominal rings, and appear each as a thickened part of the tendon of the external oblique abdominal muscle, which forms the above pillar. The length of the marsupial fibro-cartilage is six lines, its breadth from three to four lines, its thickness one line and a half.

This was the condition of the rudimental marsupial bones in two full-grown females and one male specimen of the *Thylacinus*: in a fourth large and old male a few particles of the bone-salts were deposited in the centre of the fibro-cartilage, occasioning a gritty feeling when cut across by the knife.

This unexpected and very remarkable modification of the most characteristic part of the skeleton of the Marsupialia, in one of the largest of that order, has many important bearings upon the physiology of the problematical 'ossa marsupialia.' They have been most commonly supposed to serve for the support of the marsupial pouch and young; but this pouch is well developed in the female Thylacine, and in one of the specimens which I dissected four well-developed teats, each two inches long, indicated that it had contained four

young ones when, or shortly before, it was killed. The existence of the marsupial bones in the male as well as the female sex in other marsupial animals had already invalidated the above physiological explanation, and it equally opposes the idea of the use of the marsupial bones, propounded by M. de Blainville,—that they aid in the compression required to expel the embryo. Besides, it is not in the females of those animals which give birth to the smallest young that we should expect to find auxiliary bones for increasing the power of the muscles concerned in parturition. My view of the uses of the marsupial bones, as explained in the 'Philosophical Transactions' for 1834, is, that they relate more immediately to an increase of power in the muscles (*cremasteres*) which wind round them, than of those implanted in them: and to the extent to which the cartilaginous representatives of the ossa marsupialia in the Thylacine strengthen the pillars of the abdominal ring, they must increase the contractile force of the compressors of the mammary glands and teats, which are situated and surrounded by the cremasteres in the Thylacine, as in other Marsupialia. Nevertheless, the almost obsolete condition of the ossa marsupialia in the Thylacine, and their very various relative sizes in other Marsupialia, are circumstances which seem incompatible with the same kind and degree of use in all the species: they are very slender, and not above half an inch in length in the *Myrmecobius*, whilst in the Koala they nearly equal the iliac bones in size. The so-called 'pyramidales' muscles, which derive a great proportion of their origin from the ossa marsupialia, bear a direct ratio to those bones in size; and an attentive observation of the habits and modes of locomotion of the different marsupial species is still wanting for a complete elucidation of the function of the marsupial bones. It is important to the palæontologist that the cartilaginous condition of the marsupial bones in the Thylacine should be borne in mind in regard to the evidences of the marsupial order that may be yielded by fossil remains: the fossil pelvis of the Thylacine, for example, had that species been long ago, as it soon is likely to be, extinct, would never have afforded the triumphant evidence to which Cuvier appealed in demonstration of the *Didelphys* of the gypsum quarries at Montmartre; yet the Thylacine would not therefore have been less essentially a marsupial animal. This may teach us to pause before drawing a conclusion against the marsupial character of the small Stonesfield mammalia, if their pelves should ever be found without trace of the ossa marsupialia.

"Descriptions of new Shells, collected during the voyage of the Sulphur, and in Mr. Cuming's late visit to the Philippines," by Mr. Hinds.

Abstract of the accompanying descriptions of shells:—

The number of well-authenticated species of *Terebra* hitherto on record is about sixty. In the present paper exactly fifty more are added, all of which are presumed to have been hitherto unrecorded. Of this number sixteen are from the Indian seas, six are from the African seas, twelve are from the American seas, and five are from

the Pacific; and the whole, without exception, from within the Tropics. The localities of eleven are unknown.

They most usually occur under a small incumbent pressure, generally at a depth of from five to eighteen fathoms. Some are found about low water, and with much constancy they affect situations where the floor of the ocean is composed of sandy mud.

TEREBRA, Bruguière.

TEREBRA ROBUSTA. *Ter. testâ turrito-subulatâ, solidâ, ponderosâ, albidâ, flammeis longitudinalibus interruptè pictâ; anfractibus inferioribus rotundatis, indivisis, lævigatis, superioribus versùs extremitatem spiræ subplanulatis, unocinguliferis, longitrorsum plicatis; anfractu ultimo rotundato triseriatim picto, ad basin coarctato; aperturâ elongatâ; columellâ arcuatâ, subcallosâ; epidermide luteo-fuscâ; operculo parvo, crasso.* Axis 57 lin.

Hab. West coast of America, between 8° 57′ and 21° 32′ north latitude; namely at Panama, Gulf of Nicoya, Gulf of Papagayo, and San Blas: in from four to eighteen fathoms, sandy mud.

Cab. Belcher and Cuming.

TEREBRA SUCCINEA. *Ter. testâ subulatâ, acuminatâ, succineâ, lævigatâ; anfractibus planulatis, lineâ impressâ divisis, longitrorsum plicis obsoletis vel lineis arcuatis incrementi minutis, transversim infrà lineam impressam, leviter striatis; areâ subconcavi, punctis parvis fuscis distantibus biseriatim cinctâ, versus margines tuberculato-incrassatâ.* Axis 54 lin.

Hab. ——?

Cab. Cuming.

Two specimens of this elegant species are in the above collection, without any history attached to them; they have evidently been highly cleaned, but retain the appearance of having been once covered by an epidermis.

TEREBRA CONSORS. *Ter. testâ gradatim subulatâ, lævigatâ, politâ, albidâ, flammeis pallidis fuscis ornatâ; anfractibus subplanulatis, supernè lineâ impressâ divisis, areâ superiore spiræ leviter tuberculatâ; anfractu ultimo prope basin fasciato; aperturâ infernè subeffusâ; columellâ breviusculâ.* Axis 31 lin.

Hab. Tahiti, Society Islands.

Cab. Cuming.

Its nearest ally is *T. dimidiata*, than which it is far more gradually subulate; the upper area of the divided whorl is raised and somewhat rounded; the white is the base colour of the shell, and the last whorl is distinctly banded.

TEREBRA SPECTABILIS. *Ter. testâ subulatâ, lævigatâ, politâ; anfractibus supernè sulco impresso divisis, infrà longitrorsum plicatis, interstitiis lævigatis, medio saturatè castaneis, infernè albis; cingulo tuberculato, albido; anfractu ultimo fasciato; columellâ elongatâ.* Axis 13½ lin.

Hab. Guinea, on the sands: Humphrey. Sumatra, on the sands: Ellis.

Cab. Cuming.

TEREBRA BICINCTA. *Ter. testâ subulatâ, lævigatâ, nitidâ; anfractibus rotundatis, indivisis, longitrorsum plicatis, supernè areâ coarctatâ, transversim biseriatim super plicas minutè tuberculatis; plicis tenuibus, acutis, interstitiis lævigatis; anfractu ultimo concolore.* Axis 12½ lin.

Hab. ——?

Cab. Cuming. Unique.

Remarkably and very distinctly characterized by the two rows of small tubercles which encircle the whorls. The shell is otherwise of an uniform white glassy colour, which might be attributable to its condition.

TEREBRA FATUA. *Ter. testâ turrito-subulatâ, albidâ, lævigatâ, politâ; anfractibus subplanulatis, superioribus lineâ impressâ cinctis, maculis fuscis pallidis distantibus biseriatim ornatis; spirâ obsoletè plicatâ; anfractu ultimo elongato, maculis exceptis, unicolore.* Axis 34 lin.

Hab. St. Christopher, West Indies; on the sand: Mr. Miller, 1799.

Cab. Cuming.

TEREBRA NIMBOSA. *Ter. testâ elongatè conico-subulatâ, acuminatâ, lacteâ, strigis longitudinalibus nubeculatâ; anfractibus planulatis, lævigatis, politis, integris, infernè propè suturam albâ, angustè fasciatâ, ultimo fasciato; columellâ lævi, truncatâ.* Axis 25 lin.

Hab. ——?

Cab. Cuming.

TEREBRA COPULA. *Ter. testâ elongatè turrito-subulatâ, acuminatâ, lævigatâ, nitidâ, saturatè castaneâ; anfractibus subrotundatis, supernè cingulo tuberculato cinctis, infrà plico-costatis; cingulo atro-castaneo fasciato, rarò intervallis tantùm maculato, interstitiis lævigatis; anfractu ultimo parvo, rotundato, propè basin duabus fasciis albis angustis ornato.* Axis 17 lin.

Hab. Guinea, on the sands: Humphrey.

Cab. Cuming.

TEREBRA ALVEOLATA. *Ter. testâ turrito-subulatâ, attenuatè acuminatâ, nitidâ, fuscâ; anfractibus subplanulatis, supernè cingulo tuberculato cinctis, infrà plico-costatis, interstitiis striatis; cingulo et anfractu ultimo albo fasciato, maculis quadratis rufis articulato.* Axis 16 lin.

Hab. Straits of Malacca; in seventeen fathoms, among mud.

Cab. Belcher.

The description is drawn up from a somewhat young specimen, and the mouth and last whorl have not yet attained their full development. The character of the shell is however very conspicuous. In this genus the last whorl will be found very frequently to offer decided features, and becomes a valuable aid in the diagnosis.

TEREBRA PULCHRA. *Ter. testâ turritâ, conico-subulatâ, acuminatâ, nitidâ, pallidâ; anfractibus subplanulatis, longitrorsum rectè plico-costatis, supernè lineâ impressâ cinctis, interstitiis lævigatis; anfractu ultimo pallidè lineato.* Axis 11 lin.

Hab. Marquesas; in seven fathoms.
Cab. Belcher.

Perhaps more nearly resembling *T. plicata* than any other species, from which, with a little care, the description will suffice to distinguish it. The specimens were collected at the Marquesas group of islands, which scarcely offer any particular novelty in any department of natural history; and the greatest exception will be found among *Terebra*, of which it has a few peculiar species, and also some interesting varieties of other well-known kinds. Indeed, though the group is by no means the metropolis of the genus, the species would seem to exist here under some peculiar circumstances.

Terebra columellaris. *Ter. testâ elongatâ, subcylindraceâ, turrito-subulatâ, aurantiacâ albo nebulosâ; anfractibus subrotundatis, longitrorsum undatè plico-costatis, supernè lineâ impressâ cinctis; interstitiis rufis, striatis; anfractu ultimo breviusculo, rotundato, albo fasciato.* Axis 19 lin.
Hab. ——?
Cab. Cuming.

Remarkable from its great similarity to *T. undulata*, which is itself a peculiar species. The grounds of distinction are its decidedly cylindrical shape, different distribution of the colour, and its short, abrupt, rounded and banded last whorl.

Terebra nitida. *Ter. testâ obeso-subulatâ, acuminatâ, pallidè plumbeâ, politâ; anfractibus subplanulatis, rectè plico-costatis, supernè interstitiis lineâ punctatâ cinctis, ultimo parvo subattenuato, unicolore, plicis evanidis; labio interno producto; labro anticè subsinuoso.* Axis 10 lin.
Hab. Marquesas; in seven fathoms, sandy mud.
Cab. Belcher.

An excellent diagnostic character exists in this species, in the circumstance that the girdling line which traverses the upper part of each whorl does not cross the ribs, but is confined to the interstices.

Terebra varicosa. *Ter. testâ elongatè conico-subulatâ, acuminatâ, nitidâ; anfractibus subplanulatis, plico-costatis, supernè cingulo tuberculato contractato cinctis; costis subdistantibus albidis, interstitiis striatis fuscis; anfractu ultimo breviusculo, rotundato, albo fasciato; columellâ contortâ.* Axis 11 lin.
Hab. Gulf of Papagayo, west coast of Central America; in twenty-three fathoms, mud.
Cab. Belcher.

Terebra laurina. *Ter. testâ elongatè subulatâ, acuminatâ, lævigatâ, politâ, olivaceâ; anfractibus planulatis, plicis tenuibus sinuosis, capillaribus, infrà evanidis, supernè lineâ impressâ obsoletâ cinctis, ultimo unicolore, lævigato; aperturâ fuscâ; columellâ lævi, subtruncatâ.* Axis 32 lin.
Hab. Western Africa; in sandy mud: Rev. W. V. Hennah.
Cab. Cuming.

The impressed line is always faint, and sometimes not at all visible.

The specimens are nearly of an uniform colour, but a band of somewhat deeper colour traverses the upper portion of each whorl.

Terebra stylata. *Ter. testâ subulatâ, acuminatâ, politâ, olivaceâ; anfractibus subplanulatis, integris, numerosè plicatis, infrà evanidis, propè suturam albidis maculis fuscis interruptè fasciatis, ultimo lævigato, infernè albo angustè fasciato; aperturâ fuscâ; columellâ lævi, subtruncatâ.* Axis 21 lin.

Hab. Japan; Philippine Islands.

Cab. Cuming.

Terebra tuberosa. *Ter. testâ turrito-subulatâ, saturatè fulvâ, nitidâ; anfractibus rotundatis, longitrorsum costatis, supernè cingulo numerosè tuberculato; costis brevibus; nodulosis striis decussantibus; columellâ contortâ.* Axis 11 lin.

Hab. Ticao, Philippines.

Cab. Cuming. Unique.

In this characteristic species the girdle consists of a number of small tubercles, superior in number to the vertical ribs.

Terebra conspersa. *Ter. testâ turrito-subulatâ, nitidâ, albâ; anfractibus subrotundatis, plico-costatis, supernè lineâ impressâ, præcipuè interstitiali, cinctis, propè suturam punctis rufis rarò conspersis, interstitiis striatis; anfractu ultimo ad basin fulvo.* Axis 10 lin.

Hab. Catbalonga, island of Samar, Philippines; eight fathoms, sandy mud.

Cab. Cuming.

A pretty little species, only known to me through the two specimens in the above collection; and it will readily be distinguished by its sparsely scattered rufous spots and orange base.

Terebra lingualis. *Ter. testâ turrito-subulatâ, albidâ, flammeis atro-fuscis longitudinalibus ornatâ; anfractibus planulatis, duabus lineis impressis divisis, infrà suturam tuberculatis; areâ inferiore lævigatâ; anfractu ultimo subrotundato, lævigato, fasciato; aperturâ quadratâ; columellâ contortâ.* Axis 30 lin.

Hab. Gulf of Papagayo, Bay of Montejo, west coast of America; ten to seventeen fathoms, sandy mud.

Cab. Belcher and Cuming.

The whorls, particularly those of the spire, are divided into three spaces by two girdling lines; the lower area is smooth, but the two others, particularly the most superior, is tubercled. It is a handsome species, from the deep reddish-brown flames with which it is covered.

Terebra ligata. *Ter. testâ elongatè subulatâ, acuminatâ; anfractibus planulatis, transversim striatis, cingulis duobus tuberculatis, cingulo superiore et areâ inferiore maculis quadratis fuscis transversis ornatâ, cingulo inferiore minore albidâ concolore; anfractu ultimo parvo, biseriatim maculato.* Axis 15½ lin.

Hab. Marquesas; in seven fathoms, sandy mud.

Cab. Belcher.

Terebra funiculata. *Ter. testâ elongatè subulatâ, nitidâ, fulvâ;*

anfractibus numerosis, planulatis, supernè cingulo lævi lineâ impressâ diviso, infrà cingulo minore, areâ inferiore transversim striatâ; anfractu ultimo brevi, medio sulco unico; aperturâ parvâ, concolore; labio interno subcalloso, producto. Axis 23 lin.

Hab. ——?

Cab. Belcher and Cuming.

Terebra fenestrata. *Ter. testâ elongatè conico-subulatâ, pallidè fulvâ; anfractibus planulatis, supernè cingulo nodulifero, infrà secundo minore, infernè cancellatis; apice subpapillari; anfractu ultimo quadrato ad basin abruptè contractato; aperturâ parvâ; labio interno subcalloso, producto.* Axis 15 lin.

Hab. San Nicholas, island of Zebu, Philippines; sandy mud at low water.

Cab. Cuming.

Terebra eburnea. *Ter. testâ obeso-subulatâ, albâ; anfractibus lævigatis, nitidis, supernè lineâ impressâ, infernè uni- vel biseriatim lineis punctatis cinctis; anfractu ultimo quinis seriebus linearum punctarum; aperturâ elongatâ; columellâ lævi, breviusculâ.* Axis 16 lin.

Hab. Seychelles.

Cab. Belcher. Unique.

Terebra amanda. *Ter. testâ elongatè conico-subulatâ, nitidâ; anfractibus planulatis, supernè cingulo tuberculato margaritaceo cinctis, infrà secundo minore concolore, infernè aurantiacis biseriatim punctato-lineatis, ultimo brevi; columellâ contortâ.* Axis 11 lin.

Hab. Straits of Macassar; in eleven fathoms, coarse sand.

Cab. Belcher.

An uncommonly pretty shell, offering an elegant contrast between the row of pearly tubercles and the general orange colour.

Terebra violascens. *Ter. testâ turritâ, cylindraceo-subulatâ, violaceâ; anfractibus rotundatis, longitrorsum obliquè plico-costatis, supernè lineâ impressâ obsoletè cinctis; costis subconfertis, interstitiis crebrè striatis; aperturâ parvâ, elongatâ; labio interno producto.* Axis 15 lin.

Hab. New Guinea; in seven fathoms, mud. San Nicholas, Zebu, and Mindanao, Philippines; in twenty to thirty fathoms.

Cab. Belcher and Cuming.

The Philippine specimens are of a different colour, and disposed to be banded, but they have the appearance of dead shells. The species is very like an American fossil from Alabama, *T. venusta*, Lea.

Terebra armillata. *Ter. testâ turrito-subulatâ, acuminatâ, fuscâ; anfractibus planulatis, longitrorsum subdistanter plico-costatis, transversim lineis definitis impressis, supernè cingulo noduloso, ætate valdè notabili; anfractu ultimo subquadrato, ad basin albo fasciato; aperturâ atro-fuscâ; columellâ contortâ.* Axis 22 lin.

Hab. Abundant in various localities on the west coast of America between Panama and the Bay of Magdalena in Lower California, in from five to thirteen fathoms; also at the Galapagos, in ten fa-

thoms: chiefly in sandy situations. It was also found imbedded in the fossiliferous cliffs which surround a portion of the Bay of Magdalena.

Cab. Belcher and Cuming.

TEREBRA ASPERA. *Ter. testâ turrito-subulatâ, acuminatâ, pallidâ, aurantiacâ vel fuscâ; anfractibus subrotundatis, longitrorsum subconfertè plico-costatis, nodulosis liris transversis decussantibus, supernè cingulo plico-nodulifero sparsim fusco maculato; anfractu ultimo rotundato, ad basin albo fasciato; aperturâ colorem testæ simulante; columellâ plicatâ.* Axis 23 lin.

Hab. Panama, Monte Christi, St. Elena, west coast of America; in from six to ten fathoms, sandy mud.

Cab. Cuming.

TEREBRA TUBERCULOSA. *Ter. testâ turrito-subulatâ, acuminatâ, olivaceâ; anfractibus planulatis, lævigatis, politis, supernè cingulo tuberculato, areâ inferiore triseriatim tuberculato, seriebus duabus superioribus frèquenter subevanidis; anfractu ultimo subquadrato, unicolore, multiseriatim tuberculato; columellâ contortâ.* Axis 24 lin.

Hab. Panama, Gulf of Papagayo, and San Blas; in from four to eleven fathoms.

Cab. Belcher.

TEREBRA SPECILLATA. *Ter. testâ gracilè turrito-subulatâ, valdè acuminatâ, albâ, rufo sparsim maculatâ et nebulosâ; anfractibus subplanulatis longitrorsum subdistanter tenuè plico-costatis, transversim leviter striatis, supernè cingulo tuberculato, interstitiis tuberculorum præcipuè pictis; anfractu ultimo fasciato; aperturâ parvâ; columellâ subrectâ.* Axis 20 lin.

Hab. San Blas; from seven fathoms, sandy mud.

Cab. Belcher.

TEREBRA INTERTINCTA. *Ter. testâ turrito-subulatâ, pallidâ vel cærulescente; anfractibus planulatis, politis, duabus vel tribus lineis transversis, supernè cingulo tuberculato, infernè obsoletè tuberculo-plicatis, interstitiis tuberculorum fusco maculatis; anfractu ultimo subrotundato, uniseriatim tuberculato, interstitiis nebulosis; aperturâ ovali.* Axis 20 lin.

Hab. Gambia; among sandy mud.

Cab. Cuming and Saul.

TEREBRA RADULA. *Ter. testâ turrito-subulatâ, fulvâ, nitidâ; anfractibus rotundatis, plicis tuberculatis longitudinalibus et transversis cancellatis, propè suturam serie tuberculorum majusculorum; anfractu ultimo ad basin albo angustè fasciato; aperturâ oblongâ, concolore.* Axis 19 lin.

Hab. Puerto Portrero, west coast of America; in thirteen fathoms, coral sand.

Cab. Cuming. A single specimen.

TEREBRA BIFRONS. *Ter. testâ turrito-subulatâ, lævigatâ, fuscâ; anfractibus rotundatis, inferioribus multiseriatim tuberculatis, su-*

perioribus longitrorsum biseriatim tuberculo-plicatis; tuberculis parvis approximatis, interstitiis lævibus; aperturâ oblongâ; columellâ rectiusculâ, subtruncatâ. Axis 23 lin.

Hab. Japan; sandy mud: Dr. Siebold.

Cab. Cuming. Unique.

TEREBRA GLAUCA. *Ter. testâ turrito-subulatâ, acuminatâ, glaucescente; anfractibus rotundatis, eleganter cancellatis, propè suturam cingulo albido tuberculato; anfractu ultimo elongato, pallidè fasciato; aperturâ ovali; columellâ contortâ.* Axis 14 lin.

Hab. ——?

Cab. Cuming. Unique.

TEREBRA LARVÆFORMIS. *Ter. testâ subcylindraceâ, turrito-subulatâ, fuscâ, nitidâ; anfractibus brevibus rotundatis, longitrorsum plicocostatis, supernè linea impressâ contractatis; costis rotundatis vel varicosis, interstitiis leviter striatis; anfractu ultimo breviusculo, pallidè fasciato; aperturâ pallidâ.* Axis 23 lin.

Hab. St. Elena, Monte Christi, west coast of America; in from six to fifteen fathoms, sandy mud.

Cab. Cuming.

I have examined a number of specimens of this shell, all of which I refer to this species, and find them vary much in the general and relative proportion of their outline and width of whorls.

TEREBRA ELATA. *Ter. testâ subcylindraceâ, elongatè turrito-subulatâ, pallidè fulvâ; anfractibus ferè planulatis, longitrorsum plicatis, supernè linea impressâ cinctis; plicis approximatis, interstitiis striatis, anfractu ultimo ad basin et propè suturam fusco; aperturâ elongatâ.* Axis 12 lin.

Hab. Bay of Montijo, west coast of America; in fifteen fathoms, coarse sand.

Cab. Cuming.

TEREBRA TEXTILIS. *Ter. testâ turrito-subulatâ, pallidè luteâ; anfractibus ferè planulatis, longitrorsum plicatis, supernè linea punctato-impressâ cinctis, serie tuberculorum deindè excisâ albidâ; plicis approximatis, interstitiis striatis; anfractu ultimo parvo, unicolore; columellâ plicatâ, labio interno producto.* Axis 11½ lin.

Hab. Sorsogon, Bay of Manila, Philippines; Straits of Macassar; in from six to thirteen fathoms, sand and coarse gravel.

Cab. Cuming and Belcher.

This Asiatic species very closely resembles the American just described, and furnishes another of those instances of affinity, whilst still retaining unquestionable distinctness, which occur so frequently in the shells of the tropics of the two hemispheres; and thus whilst both are enriched by similar forms, these present themselves under slight but constant differences.

TEREBRA PICTA. *Ter. testâ subcylindraceâ, turrito-subulatâ, nitidâ, pallidè aurantiacâ, atro-fusco longitrorsum maculatâ vel nebulosâ; anfractibus rotundatis, supernè cingulo tuberculato, infrà plicocostatis, interstitiis striatis; anfractu ultimo fasciato; aperturâ parvâ, atro-fuscâ; columellâ subrectâ.* Axis 15 lin.

Hab. San Nicholas, island of Zebu, Philippines.
Cab. Cuming.

TEREBRA CASTA. *Ter. testâ turrito-subulatâ, albescente, lævigatâ, politâ; anfractibus integris, planulatis, supernè plicatis et lacteo fasciatis, infrà lævigatis, strigis longitudinalibus pallidè fuscis nebulosis; anfractu ultimo subelongato, lacteo fasciato; columellâ brevi, subrectâ.* Axis 13 lin.
Hab. Ilo-ilo, island of Panay, Philippines, at low water.
Cab. Cuming.

TEREBRA INCONSTANS. *Ter. testâ obeso-subulatâ, acuminatâ, lividâ vel pallidâ, politâ; anfractibus integris, subrotundatis, longitrorsum plicatis, interstitiis lævigatis; infra suturam et ad basin anfractûs ultimi pallidè fasciatâ; aperturâ effusâ; columellâ truncatâ, subcallosâ.* Axis 16 lin.
Hab. Sandwich Islands.
Cab. Cuming.

This species has much of the general character of *T. anomala*, but the whorls are constantly entire, and the shells are more acuminate and obese.

TEREBRA PENICILLATA. *Ter. testâ turritâ, obeso-subulatâ, lævigatâ, politâ, albâ lineis undatis rufis longitrorsum dispositis; anfractibus integris, ultimo elongato, efasciato; spirâ obsoletè plicatâ; aperturâ elongatâ; columellâ lævi.* Axis 17 lin.
Hab. Seychelles.
Cab. Belcher and Cuming.

TEREBRA VENOSA. *Ter. testâ subcylindraceo-subulatâ, lævigatâ, politâ; anfractibus integris, subplanulatis, supernè albo, infrà purpureo cinctis, strigis rufis longitudinalibus flexuosis; spirâ plicatâ, anfractu ultimo subrotundato, rariùs transversim fasciato vel lineato; aperturâ elongatâ, albâ.* Axis 16 lin.
Hab. ——?
Cab. Cuming.

The only species in this now extensive genus where the fasciation of the last whorl is not to be relied on as a character.

These two species have been united by M. Kiener with *T. lanceata*, but I cannot help regarding them as most unquestionably distinct.

TEREBRA LUCTUOSA. *Ter. testâ gracilè acuminatâ, lævigatâ, politâ, atro-fuscâ, rariùs castaneâ vel olivaceâ; anfractibus subplanulatis, integris, supernè plicis parvis undatis, infrà evanidis, ultimo elongato, concolore; columellâ lævi, breviusculâ.* Axis 17 lin.
Hab. Gulf of Nicoya; Puerto Portrero, west coast of America; in twelve fathoms, coral sand.
Cab. Cuming and Belcher.

TEREBRA CUSPIDATA. *Ter. testâ gracilè et elongatè subulatâ, valdè acuminatâ, lævigatâ, politâ, nitidâ; anfractibus planulatis, integris, supernè plicatis, infrà evanidis, pallidis cæruleo angustè fasciatis; anfractu ultimo lævigato, subdiaphano, ad basin fasciâ rufâ ornato.* Axis 13 lin.
Hab. Cape Coast, Africa: Humphrey.
Cab. Cuming.

Terebra micans. *Ter. testâ conico-subulatâ, acuminatâ, semiopacâ, pallidè fulvâ, nitidâ; anfractibus planulatis, integris, longitrorsum plicis capillaribus, supernè cæruleo et ad basin anfractûs ultimi fusco fasciatis; aperturâ infernè effusâ; columellâ truncatâ.* Axis 13 lin.

Hab. —— ?

Cab. Cuming.

The specific name I find in use as a cabinet name, but I am ignorant who is the originator.

Terebra lepida. *Ter. testâ obeso- vel rariùs subcylindraceo-subulatâ, acuminatâ, lævigatâ, politâ, albidâ vel pallidè fulvâ; anfractibus planulatis, integris, plicis longitudinalibus acutis, interstitiis lævigatis, supernè maculis rufis cinctis; anfractu ultimo subcylindraceo, pallidè fasciato.* Axis 10 lin.

Hab. Guinea; on the sands: Humphrey.

Cab. Cuming.

Terebra obesa. *Ter. testâ obeso-subulatâ, lævigatâ, albidâ, maculis fuscis longitudinalibus pallidè ornatâ; anfractibus paucis, subrotundatis, integris, ultimo biseriatim maculato; spirâ obsoletè plicatâ; aperturâ oblongâ; columellâ truncatâ.* Axis 6 lin.

Hab. —— ?

Cab. Cuming. Unique.

In this singular little shell the last whorl occupies nearly one half of the entire length.

Terebra nassoides. *Ter. testâ obeso-subulatâ, lævigatâ, nitidâ, anfractibus planulatis, integris, supernè albo, mediò fusco cinctis, ultimo unicolore; aperturâ infernè effusâ.* Axis 6 lin.

Hab. —— ?

Cab. Cuming.

Terebra rustica. *Ter. testâ obeso-subulatâ, acuminatâ, fuscâ, nitidâ, striis transversis scabrâ; anfractibus subrotundatis, longitrorsum plico-costatis, supernè infra suturam luteis; plicis subdistantibus, ferè continuis; anfractu ultimo elongato, concolore; aperturâ elongatâ; columellâ lævi, subrectâ.* Axis 8 lin.

Hab. —— ?

Cab. Metcalfe.

Terebra tenera. *Ter. testâ parvâ, obeso-subulatâ, lævigatâ, nitidâ, anfractibus plico-costatis, pallidè fulvis, supernè prope suturam rufo fasciatis, ultimo ad basin rufo; plicis continuis; columellâ contortâ.* Axis 4 lin.

Hab. Straits of Malacca, in seventeen fathoms; Ceylon.

Cab. Belcher.

Terebra mera. *Ter. testâ subcylindraceo-subulatâ, lævigatâ, nitidâ, albidâ, vel pallidè rufo latè fasciatâ; anfractibus subplanulatis, supernè plicis parvis numerosis obliquis, infrà evanidis; aperturâ parvâ, elongatâ; columellâ subtruncatâ.* Axis $7\frac{1}{2}$ lin.

Hab. Straits of Malacca, in seventeen fathoms.

Cab. Belcher.

Terebra pygmæa. *Ter. testâ purpureâ, obeso-subulatâ; anfrac-*

tibus paucis, subrotundatis, longitrorsum minutè plico-costatis, supernè insigniter fasciâ angustâ atro-purpureâ cinctis, ultimo propè basin fasciato; aperturâ parvâ, fuscâ; labio interno subproducto. Axis 3 lin.

Hab. Straits of Malacca, in seventeen fathoms.

Cab. Belcher.

GEOLOGICAL SOCIETY.

June 21, 1843.—The following papers were read:—

1. "Supplement to a Memoir on the Fossil species of *Chimæra*." By Sir P. Grey Egerton, M.P., F.G.S.

Since the author's former memoir was communicated to the Society*, he has seen in the collection of Mr. Dixon a new and striking addition to the genus *Ischyodus*. The specimen is from the chalk of Southeram, and presents two dental plates only slightly dislocated from their natural juxtaposition. At first sight these would appear to be the dental armature of the lower jaw, corresponding nearly in size to the lower mandibles of *Ischyodus Mantelli*. A closer examination has satisfied Sir Philip Egerton that they are in reality the intermaxillary plates of the upper jaw of a most gigantic chimæroid. They exceed in size the corresponding teeth of *Ischyodus Townshendi*, the largest species hitherto found, by one third. As compared with the intermaxillaries of that species they are broader, more compressed and less robust in antero-posterior diameter, and less hooked at the extremity. The form of the cutting edge is not truncate, as in the recent *Chimæra*, but prolonged to an acute angle, and bent downwards like the upper mandible of a bird of prey. The symphysis is smooth and slightly hollowed. The thin polished investing lamina of compact dentine is seen adhering to the surface of the tooth. On the interior surface this is marked with broad transverse irregularities similar to, although less distinct than, those seen in the recent *Chimæra*. A fragment in Mr. Dixon's collection gives evidence of having belonged to an individual of much larger size than that which furnished the specimens here described. Sir Philip Egerton proposes to name this species *Ischyodus Gigas*.

2. "On the occurrence of the remains of Insects in the Upper Lias of the county of Gloucester." By James Buckman, F.G.S.

The remains described in this paper were discovered by Mr. Buckman in a thin seam of argillaceous limestone in the upper lias beds at Dumbleton, a village twelve miles from Cheltenham, to which his attention had been directed by Mr. Brodie, who had suspected the existence of insect remains in the stratum. The section of Dumbleton Hill, which is a liassic outlier, presents the following beds.

	ft.	in.
1. Sandy debris from the oolite, about	10	0
2. Upper lias shale: this is traversed at twelve feet from its base by the thin bed of fissile limestone five inches in thickness	60	0
3. Lias marlstone, about.....	20	0
	90	0

* See vol. xii. p. 467.

The thin seam of limestone included in No. 2 is remarkable for containing many organic remains not found in any other part of the lias, and most of them new, comprising land as well as marine animals and traces of plants. Among them are two undetermined species of fish with numerous fish-scales and coprolites, two species of Crustacea, the one allied to *Astacus* (Fabr.), the other to *Hippolyte* (Leach). A species of Loligo, a new Belemnite, a new Ammonite (which Mr. Buckman has named *A. Murleyi*), *A. corrugatus* and *ovatus*, a small univalve in great abundance, and *Inoceramus dubius*. The remains of insects comprise one species of *Libellula*, which, from the reticulations of the fine wings, seems to belong to the genus *Æschna*, Fabr., and has been named by Mr. Buckman *Æ. Brodiei*, in honour of Mr. Brodie; two species of Coleoptera of undetermined genera, and a wing supposed to belong to *Tipula*. None of these are of the same species with the insects found by Mr. Brodie in the lower lias.

From the presence of a similar band of stone with that containing the above mentioned fossils at Churchdown and Robin Hood Hill, liassic outliers presenting the same section as that of Dumbleton Hill, Mr. Buckman supposes that this thin seam is of constant occurrence in the upper lias of the neighbourhood. He concludes that the period, which the state of things which produced it continued, was not of long duration, and that its deposition was of a quiescent kind.

MISCELLANEOUS.

ON A NEW SPECIES OF CERVUS, CERVUS DIMORPHE.

BY B. H. HODGSON, ESQ.

In January last I procured from the Saul forest of the Morung a young stag rising two years, having horns of a unique character, and a stature and other attributes seeming to place him between the Axines and Rusans. I considered this animal to belong to a new species, but as he was young and had the horns imperfect, I determined to wait awhile before noticing him to the Society. The animal since his arrival has lived and flourished in my stable. He is now nearly three years old, and his horns are perfect; but his pelage is in course of moult or change. I will not, however, longer defer giving a summary description and sketch of what I apprehend to be an undescribed, though large and handsome species of deer. This animal, like *Cervus Wallichii* and *Cervus Elaphoïdes* vel *Duvancellii*, possesses a mixed character, so that I hesitate to class it with any known group at present, and shall merely indicate this attribute by assigning to it the trivial name of *Dimorphé*. My specimen has been reared in confinement; yet it approaches the Rusans in size and stature, but retains, in youth at least, a good deal of the graceful Axine type. Its horns are small, owing to confinement perhaps, and it is possible that maturer age may develope more snags or antlers. At present there is but one on each beam, and it has a very forward

direction, as in *Elaphus* and our *affinis*, species to which the present one is also allied by its short tail and moderate suborbitar sinus.

Cervus Dimorphé, mihi. Deer with moderate, pale, smooth horns. Axine in the general style, but more bent in the middle of the beam, more divergent, and possessed of only one basal antler, which is directed very forward; small, or moderate, and vertical suborbital sinuses; interdigital pores; broad spreading ears and short stag-like tail. Stature and aspect mediate between the Axines and Rusans. In youth bright fawn-red, spotted with white; in age nigrescent bay with blackish neck and belly; a dark list round the muzzle and white chin; limbs pale. Habitat the Saul forest.—*Journal of the Asiatic Society of Bengal*, No. 58, p. 897.

ON A SUPPOSED NEW SPECIES OF HIPPOPOTAMUS.

BY S. G. MORTON, M.D.

It is about six months since I received from my friend Dr. Goheen an extensive series of skulls of mammiferous and other animals from Western Africa: they had been obtained by him during a residence of several years at Monrovia, where he had officiated as colonial physician; a situation which gave him great advantages for procuring the natural productions of that region. Among these crania were two of a hippopotamus of small size, from the river St. Paul's. Although nothing could be more manifest than the difference between the head of this animal and that of the common species, I have hesitated to publish it, from a fear that some one else may already have done so; for I could hardly convince myself that so remarkable a species was wholly unnoticed in the systems. Having, however, searched the latest European works on zoology without finding any account of this interesting animal, I venture to submit the following facts in relation to it:—

HIPPOPOTAMUS MINOR.

Incisors $\frac{4}{2}$ or $\frac{2-2}{1-1}$; canines $\frac{1-1}{1-1}$.

Dental Formula:

False molars $\frac{4-4}{4-4}$; molars $\frac{3-3}{3-3}$.

	Inches.
Length of the skull, measured from the anterior extremity to the notch between the condyles of the occipital bone	12·3
Zygomatic diameter	8·
Parietal diameter	3·5
Distance between the orbits over the surface of the skull	3·9
Vertical diameter of orbit	2·
Horizontal diameter of orbit	1·8

These measurements have been taken from a very old individual, in which the sutures are entirely obsolete, and the teeth worn almost to the level of the jaw; and the contrast in size between this and the large or common species (familiar to every one as the *H. amphibius*, but recently divided into two species, the *H. capensis* and *H. sene-*

galensis) will be manifest to every one. The difference, however, is not only in size, but in all the proportions of the head.

In the *H. minor* there is a uniform *convexity* of the upper surface of the cranium from orbit to orbit, and between the occiput and ossa nasi; while in the common species the orbits are remarkably elevated, and the intermediate surface is *concave*. The orbit is placed about midway between the occiput and snout, and the latter is consequently short; while in the large species the orbits are placed about one-third the distance between the occiput and snout. The *H. minor* has only two canines in the lower jaw; the false molars are proximate to the canines; and the base of the zygomata is in the same plane with the upper maxilla.

The second skull of this species (which is of the same length as the other) is that of a younger animal; for the sutures are open, and the teeth in the process of changing from the deciduous to the permanent set. The posterior molars are only partially protruded, and rise obliquely from the jaws, like those of the elephant and mastodon.

Dr. Goheen, who assured me from the first that he could find no notice of this animal in the systematic works, has obligingly favoured me with the following memorandum in relation to it:—"This animal abounds in the river St. Paul's, and varies in weight from 400 to 700 pounds. They are slow and heavy in their motions, yet will sometimes stray two or three miles from the river, in which situation they are killed by the natives. They are extremely tenacious of life, and almost invulnerable, excepting when shot or otherwise wounded in the heart. When injured they become irritable and dangerous, but are said by the natives never to attack them when in their canoes. The negroes are very fond of the flesh, which seems to be intermediate in flavour between beef and veal."

My comparisons with the common hippopotamus have been made on four specimens (three of which are fully grown); two from the vicinity of the Cape of Good Hope, and two from the Senegal river.—*Proceedings of the Acad. Nat. Sciences of Philadelphia*, Feb. 27, 1844.

KENTISH BIRDS.

To the Editors of the Annals of Natural History.

Gentlemen,—In my last letter I complained of not having the wind N.E. by E., which for the Kentish coast is the best wind for collecting birds. It has been in that direction for some time and produced a good supply, particularly the Whimbrel, which has oocurred in immense numbers, and so tame, that on their first arrival there was no difficulty in getting a good shot at them. Greenshanks rather thinner this year than usual, but the Redshank in great abundance. I have also got two specimens of the Wood Sandpiper: I only saw three, and succeeded in killing two, male and female. About the 8th of last month I shot four beautiful specimens of the Purple Sandpiper, which are in good condition. I have also some very fine specimens of the Lesser Tern, Common Tern and Sandwich Tern, with all of

which the coast has been plentifully supplied during the easterly winds.

About the 14th of last month I shot a very fine old male black Redstart in perfect plumage. A pair of Golden Orioles have been in the large gardens at Kingsgate, which were there for nearly a week, but I could not get a shot at them, being so very wild. On Saturday last I also succeeded in shooting, at about five miles from Margate, a good specimen of the Rose-coloured Pastor: there were two of them, one escaped; that which I shot is a male. I have also a good specimen of the Spotted Sandpiper, which was killed last year.

144 High Street, Margate. S. MUMMERY.

SCIENTIFIC APPOINTMENTS IN TRINITY COLLEGE, DUBLIN.

It affords us very high gratification, more especially at the present time, when some of our English Universities seem disposed to make a retrograde movement in science, to be able to announce that several appointments for the promotion of Natural Science have recently been made in Ireland's only University. A chair of geology has been founded, and the distinguished Assistant Secretary of the British Association for the Advancement of Science, Mr. John Phillips—who for some time filled the chair of geology in King's College, London—has been appointed to it. With Trinity College a museum has always been connected, but in these days of progress it had become quite of an antiquated character. With the view of making it as extensively useful as possible, particularly in objects of science, a new office—Director of the Museum—has been formed, and Mr. Robert Ball, the well-known Secretary of the Royal Zoological Society of Ireland, elected to fill it, this gentleman making over to the College his own most valuable and extensive collection of natural history. To secure to the College the large collection of plants made by Dr. Coulter in California and Mexico, and to have the benefit of his botanical services, that distinguished traveller was a few years since appointed Curator of the herbarium, and his collection became the property of the University. After his lamented death, which occurred about six months ago, a successor to the new office was sought for, and that most able botanist Mr. William Henry Harvey was elected, the College, as in the case of Dr. Coulter, securing the whole of his very large and important herbarium.

About the same time the chair of botany became vacant, and Dr. George J. Allman, the most rising philosophical naturalist in Ireland, was elected to it. Better appointments than these, individually and collectively, could not have been made, and the enlightened and liberal spirit with which they have been carried out is worthy of all admiration. The best men, without reference to any previous connexion by education with the College, or to any of those external influences which even at great seats of learning will affect elections, were appointed, their eminent fitness alone for the respective offices, without any of the ordinary alloy, deciding the election.

When mentioning these appointments, it is justly due to the me-

mory of the late Dr. Lloyd, Provost of Trinity College, to state that it was his anxious wish to found a school of Natural History in the University over which he presided, and that it was in immediate course of being carried into effect in the year 1837 when interrupted by his sudden death.

HABITS OF THE MANTIS.

In a letter from Herr Chr. Zimmerman in Rockingham in North Carolina to Dr. Erichson, editor of the 'Archiv fur Naturgeschichte,' in which he quaintly retorts upon the latter for incredulity respecting some former statements of his relative to the food of *Mantis Carolina* consisting of amphibia, this fact is fully confirmed by the following additional observations :—Your report having come to hand last September, just the time when the *Mantides* begin to make their appearance, I had abundant opportunities of repeating my experiments. Instead of the little striped lizard (*Scincus 5-lineatus*) as heretofore, I made use of a species of newt (*Salamandra cirrhigera*, Holbri) equally active and more abundant. Its fate was as I anticipated. One newt after the other was seized, and to a greater or less extent devoured. In vain did they endeavour, by rapid contortions of the body and blows with the tail, to elude the grasp of the mantis, which, with the head depressed and the hinder part of the body tilted upwards, kept a firm hold of its victim, and ate until it could eat no more. I send you the very specimen of mantis with which these experiments were performed. Whenever a mantis seizes another insect or small animal, the anterior fang-like extremities are brought down to below the level of the head, so as to avoid having to sustain the weight of the prey.—A. T.

ETHNOLOGY.

A tract has been published by M. d'Omalius d'Halloy "*Sur les Races Humaines*," of which the following is the account given by the author when presenting it to the Academy of Sciences. He states that he had endeavoured to show, that in classing the modifications of the human race, the *natural characters*, such as form and colour, ought to take the precedence of language, historical filiation, and other *social* considerations. He then points out that the application of this principle leads him to remove the Hindoos and Abyssinians from the whites and to add them to the brown race, which thus becomes composed of three geographical groups, separated respectively by the Sea of Oman and the Gulf of Bengal. He concludes with remarking upon the constantly progressive development of the whiter varieties of the human race, whilst the coloured races, and also the least fair of the white race, are stationary or retrograde; whence it may be said, that notwithstanding the stability which now characterizes organic nature, there is yet in progress a phænomenon of a like kind with that which is revealed to us in the palæontological study of the terrestrial globe, which exhibits the successive appearance of species more and more perfect; fish having preceded

reptiles, reptiles the didelphous mammalia, and these latter the monodelphous; man having come last, to crown the series.—*Comptes Rendus*, April 15, 1844.

SAURIAN FOSSILS.

For the following information we are indebted to Prof. Bronn of Heidelberg.

A collection of two Mystriosauri and six or seven Ichthyosauri, from the lias of Germany, will be sold, together or separately, at Heidelberg, on the 1st of October 1844. All possess perfect heads (the bones being separate in the Ichthyosauri), the body complete as far as the tail, and at least a portion of the extremities more or less perfect. The Mystriosauri are of the species *M. Mandelslohi*, n. sp., with 48 vertebræ, 11 feet long; and *M. longipes*, n. sp., with 53 vertebræ, and 5 feet long. Five specimens of *Ichthyosaurus acutirostris*, Ow., are respectively perfect as far as the 65th, 102nd, 117th, 122nd and 123rd vertebræ, and one, *I. communis* (if it is not a new species), perfect to the 66th vertebra. The Ichthyosauri (from 4 to 9 feet long) have been described in the 'Neue Jahrbuch für Mineralogie,' 1844, p. 385–408, pl. 3 and 4; the Mystriosauri in the Supplement to the 'Gavials Fossiles du Lias' by Bronn and Kaup, p. 37–47, pl. 5 and 6.

Persons wishing for further information may obtain it from Prof. H. G. Bronn of Heidelberg.

METEOROLOGICAL OBSERVATIONS FOR MAY 1844.

Chiswick.—May 1. Dry haze: excessively dry: clear and fine. 2, 3. Cloudless: excessively dry. 4. Slight rain. 5—7. Overcast and fine. 8. Dry haze. 9. Sultry. 10. Overcast: very fine. 11, 12. Very fine. 13. Sultry. 14, 15. Very fine. 16. Cloudy and fine. 17. Cloudy and windy. 18, 19. Boisterous. 20. Boisterous: cold and dry. 21. Drizzly. 22. Dry haze: very fine. 23. Cold haze. 24. Cloudy and cold: fine. 25. Overcast: fine: clear. 26, 27. Cloudy and cold. 28. Cloudy. 29. Overcast: slight drizzle: rain at night. 30. Cloudy. 31. Overcast: fine: clear.—Mean temperature of the month 1°·2 below the average.

Boston.—May 1—3. Fine. 4. Cloudy. 5—7. Fine. 8, 9. Cloudy. 10. Cloudy: rain P.M. 11. Fine. 12. Cloudy. 13, 14. Fine. 15. Cloudy. 16. Fine. 17. Rain. 18. Cloudy: rain P.M., with rainbow. 19. Windy. 20, 21. Windy: rain P.M. 22, 23. Cloudy. 24. Cloudy: rain P.M. 25—31. Cloudy.

Sandwick Manse, Orkney.—May 1. Bright: clear. 2. Bright: cloudy. 3. Damp: clear. 4. Bright: clear. 5. Bright: cloudy. 6. Bright: rain. 7, 8. Bright: clear. 9. Damp: rain. 10. Drizzle: damp. 11, 12. Cloudy: clear. 13. Clear: showers. 14. Bright: cleared. 15. Cloudy. 16. Cloudy: showers. 17. Showers. 18. Clear: showers. 19. Bright: clear. 20. Bright: cloudy. 21, 22. Bright: damp. 23. Cloudy. 24. Cloudy: clear. 25. Bright: clear. 26, 27. Bright: cloudy. 28, 29. Cloudy. 30, 31. Cloudy: damp.

Applegarth Manse, Dumfries-shire.—May 1—3. Fine, but parching. 4—6. Very droughty. 7. One slight shower A.M. 8. Fair. 9, 10. Showers, slight. 11. Fair, but cloudy. 12, 13. Fair and clear. 14. Cool. 15—17. Fair and withering. 18. Hoar-frost A.M. 19, 20. Fair and very dry. 21. Very high wind. 22—28. Very withering. 29. Hoar-frost. 30. Hoar-frost: dry. 31. A few drops of rain.

Mean temperature of May	52°·3
Mean temperature of May 1843	49 ·4
Mean temperature of spring water	48 ·1
Mean temperature of ditto May 1843	48 ·0

Meteorological Observations made by Mr. Thompson *at the Garden of the Horticultural Society at* Chiswick, *near London; by* Mr. Veall, *at* Boston; *by the* Rev. W. Dunbar, *at Applegarth Manse,* Dumfries-shire; *and by the* Rev. C. Clouston, *at Sandwick Manse,* Orkney.

Days of Month.	Barometer.							Thermometer.							Wind.				Rain.			
	Chiswick.		Boston. 8½ a.m.	Dumfries-shire.		Orkney, Sandwick.		Chiswick.		Boston. 8½ a.m.	Dumfries-shire.		Orkney, Sandwick.		Chiswick. 1 p.m.	Boston.	Dumfries-shire.	Orkney, Sandwick.	Chiswick.	Boston.	Dumfries-shire.	Orkney, Sandwick.
1844. May.	Max.	Min.		9 a.m.	9 p.m.	9½ a.m.	8½ p.m.	Max.	Min.		Max.	Min.	9½ a.m.	8½ p.m.								
1.	30·469	30·336	29·92	30·33	30·37	30·33	30·40	70	38	57	69	36	54	51	e.	calm	s.	w.	.....	.....	.....	.....
○ 2.	30·432	30·336	29·94	30·40	30·30	30·42	30·37	71	46	58	68	40½	56	52	e.	e.	s.	w.	.....	.....	.....	.....
3.	30·213	30·138	29·67	30·22	30·22	30·38	30·41	65	45	58	65½	38½	52	43	ne.	calm	sw.se.	w.	.....	.....	.....	.....
4.	30·132	30·090	29·72	30·29	30·21	30·40	30·35	59	48	51·5	58½	44	48	42	ne.	calm	ne.	e.	·01	.....	.....	.....
5.	30·060	29·913	29·62	30·12	29·98	30·24	30·18	72	43	57	68	44	50	48	ne.	calm	ne.	s.	.....	.....	.....	.....
6.	29·867	29·791	29·33	29·86	29·75	29·90	29·16	72	36	60	70	42	54	50	e.	calm	se.	se.	.....	.....	.....	·10
7.	29·868	29·792	29·25	29·79	29·85	29·90	29·94	76	43	61	63	46½	50	46	n.	calm	nw.	w.	.....	.....	0·02	·50
8.	29·947	29·944	29·44	29·90	29·89	29·92	30·33	69	44	56	66	38½	50	54	e.	calm	s.	se.	.....	.....	.....	.....
☾ 9.	29·962	29·933	29·48	29·89	29·86	29·98	29·87	78	49	53	62½	34	56	51	sw.	calm	s.	s.	.....	.....	.....	.....
10.	29·942	29·910	29·34	29·84	29·91	30·00	30·30	68	38	56	55½	41	48	46	w.	w.	nw.	w.	·07	.....	.....	·58
11.	30·060	29·931	29·44	30·01	30·03	30·10	30·31	64	52	57	62	49½	52	48	ne.	calm	sw.	n.	.....	·35	.....	·10
12.	30·262	30·183	29·64	30·10	30·21	30·10	30·29	72	41	56	66½	42½	53	46	ne.	calm	sw.	sw.	.....	.....	.....	.....
13.	30·335	30·309	29·70	30·28	30·28	30·22	30·14	78	39	63	66½	43	53	47	ne.	calm	w.	sw.	.....	.....	.....	.....
14.	30·322	30·272	29·73	30·29	30·31	30·33	30·37	70	38	60	64½	51½	48	47	ne.	calm	ene.	nw.	.....	.....	0·26	·07
15.	30·365	30·285	29·87	30·38	30·30	30·41	30·33	60	41	52	65	46	48	45	ne.	n.	ene.	w.	.....	.....	.....	.....
16.	30·242	29·961	29·77	30·10	29·94	30·12	30·06	65	40	55	63	37	49	46	ne.	calm	sw.	sw.	.....	.....	.....	.....
● 17.	29·964	29·886	29·40	30·00	29·98	30·05	30·06	59	32	49·5	53	41	38	36	ne.	ne.	n.	nw.	.....	.....	.....	·10
18.	29·989	29·927	29·49	30·01	30·13	30·02	30·24	54	44	47	51	31½	43	40	ne.	n.	ne.nw	n.	·02	·07	.....	·15
19.	29·997	29·956	29·64	30·17	30·15	30·30	30·30	60	43	51	54½	34	46	43	ne.	e.	nne.	n.	.....	·04	.....	.....
20.	29·988	29·982	29·62	30·13	30·08	30·00	30·26	63	40	51	52½	35½	50	45	ne.	n.	n.	n.	.....	.....	.....	.....
21.	29·926	29·858	29·43	30·05	30·22	30·33	30·48	62	46	52	61	43	52	50	ne.	ne.	ne.	w.	·02	·03	.....	.....
22.	30·164	30·146	29·66	30·25	30·29	30·41	30·40	67	46	53	65	47	48	45	ne.	e.	nne.	w.	.....	·02	0·00	.....
23.	30·136	30·086	29·70	30·24	30·16	30·40	30·34	70	43	53	69½	50	50	46	ne.	ne.	ne.	n.	.....	.....	.....	.....
24.	30·076	29·968	29·55	30·22	30·08	30·25	30·22	66	45	54	66	43½	49	46	ne.	n.	ne.	w.	.....	.....	.....	.....
☽ 25.	30·103	30·019	29·58	30·14	30·20	30·26	30·30	65	40	51·5	62	44½	47	43	ne.	ne.	ne.	nw.	.....	·01	.....	.....
26.	30·206	30·156	29·70	30·27	30·30	30·35	30·34	58	41	51·5	60	38½	48	47	ne.	ne.	ne.	nw.	.....	.....	.....	.....
27.	30·199	30·125	29·81	30·27	30·25	30·40	30·34	56	43	51	61	33½	50	46	ne.	ne.	ne.	nw.	·06	.....	.....	.....
28.	30·026	29·956	29·73	30·18	30·08	30·36	30·22	59	48	53	61	39½	48	46	e.	ne.	ne.	w.	.....	.....	.....	.....
29.	29·935	29·927	29·55	30·06	30·04	30·20	30·20	58	44	52	59	43	50	47	ne.	ne.	ene.	ne.	·07	.....	0·00	.....
30.	30·023	30·002	29·55	30·03	30·05	30·16	30·18	61	45	52	58½	45	50	45	ne.	ne.	ene.	ne.	.....	.....	.....	.....
○ 31.	30·035	30·001	29·54	30·08	30·03	30·20	30·15	61	42	52·5	60	41½	50	46	e.	calm	ene.	nw.	.....	.....	.....	.....
Mean.	30·104	30·036	29·60	30·103	30·111	30·207	30·220	65·10	42·68	54·3	62·1	42·1	49·67	46·22					0·25	0·52	0·28	1·60

THE ANNALS

AND

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XII. — *An Account of some enormous Fossil Bones of an unknown species of the Class* Aves, *lately discovered in New Zealand.* By the Rev. WILLIAM COLENSO.

IT was during the summer of 1838 that I accompanied the Rev. W. Williams on a visit to the tribes inhabiting the East Cape district. Whilst at Waiapu (a thickly inhabited locality about twenty miles S.W. from the East Cape), I heard from the natives of a certain monstrous animal, which, while some said it was a bird, and others "a person," all agreed that it was called a *Moa*; that in general appearance it somewhat resembled an immense domestic cock, with the difference, however, of its possessing a "face like a man;" that it dwelt in a cavern in the precipitous side of a mountain; that it lived on air, and was attended or guarded by two immense *Tuataras**, who, Argus-like, kept incessant watch while the *Moa* slept; and that if any one possessing temerity sufficient dared to approach the dwelling of this wonderful creature, he would be infallibly killed by it: an act which it was said to execute much in the same manner as that by which those unhappy criminals are summarily punished in the dominions of the native Indian princes, by the trampling of an elephant, and at which feat this celebrated *Moa* was quite expert.

A mountain, named Wakapunake, at least eighty miles distant in a southerly direction, was spoken of as the residence of this creature; where however only one existed, which one, it was contended by the many, was the sole survivor of the *Moa* race, although they could not assign any possible reason why it should have become all but extinct.

While, however, the existence of the *Moa* was universally believed, (in fact, to dare to doubt of such a being amounted in the native estimation to a very high crime,) no one person could be found who could positively testify to his having had ocular proof of the existence of the animal; for while with every one it was a matter of the profoundest credence, that belief only rested on the bare and unsupported assertion of others. Many of the

* See Note A., Appendix.

natives, however, had from time to time seen very large bones; larger, from their account, than those of an ox; these bones they cut up into small pieces for the purpose of fastening to their fish-hooks as a lure instead of the *Haliotis* shell*, it answering that purpose much better, from its going more equably through the water.

It was almost ludicrous, whilst at the same time it showed the powerful effect which this belief of theirs had over them, to witness their unconcealed fear, almost amounting to horror, on being requested to go to the residence of the *Moa* to procure it, or as a guide thither for that purpose. Unlike, too, what has been very frequently observed in savage nations, this fear seemed not to arise from any degree of superstitious dread, but merely from an abiding conviction of the physical powers of this prodigious animal; as well as from their belief of the moral certainty of such powers being put into immediate action, if they dared to intrude within the precincts of his resort.

As a matter of course, I treated the whole story (as far as related to the present existence of such an animal) as fabulous; looking on it as one more of those many peculiar tales and legends which so abounded in the "olden time," and which every nation under heaven invariably possesses; and I could but think what an excellent companion for the celebrated *roc*† of oriental story and fairy-tale for the nursery it would have made, had it but been known a little earlier.

On our return to the Bay of Islands, several natives from the East Cape district accompanied us. From them I subsequently received pretty nearly the same detail concerning the *Moa*, as I had given me before when in that neighbourhood.

In the following year, 1839, the Rev. W. Williams again visited that district, accompanied by the Rev. R. Taylor. The non-arrival, by the time appointed, of the vessel by which these gentlemen were to return to the Bay of Islands, (and through which cause they were detained a fortnight at the East Cape,) afforded them much more leisure time than I had when there. Mr. Taylor, hearing of this *Moa*, prosecuted his inquiries, and was subsequently rewarded with the discovery of (what appeared to be) a part of a fossil *toe* (or rather claw?) of some gigantic bird of former days.

In the summer of 1841–2, I again visited those parts. At Waiapu I gained the information, that Wakapunake (the mountain where the *Moa* was said to reside) had been visited by some baptized natives, purposely to ascertain the truth of the common belief, and which they declared to be altogether without founda-

* See Note B., Appendix. † See Note C., Appendix.

tion; finding neither cavern, nor lizard-guards, nor *Moa*, nor any signs of such uncommon *lusus naturæ*. But what was of far greater interest to me than this relation of theirs, were some bones which I had the good fortune to procure from them, and which were declared by the natives to be true *Moa* bones. These bones, seven in number, were all imperfect, and comprised five *femora*, one *tibia*, and one which I have not yet been able satisfactorily to determine. The largest *femur*, consisting of the diaphysis only without the processes, measured 8 inches in length, and $4\frac{3}{4}$ inches in girth in the narrowest part. The portion of the *tibia*, which like the *femur* consisted only of the middle part, measured in length 6 inches, and in circumference 4 inches at the narrowest and 5 inches at the widest part. The remaining bone, the largest of all, which was merely a section, measured in length 6 inches, and in circumference $7\frac{1}{4}$ inches at the smallest part. These bones were all (excepting the last-mentioned) of a very dark colour, almost a ferruginous brown, and appeared to have entirely lost their oily matter. They were very stout, especially the *tibia*, and were strongly marked and indented on the outside with muscular impressions. What little remained within of the reticulated cells appeared to be nearly perfect. They were all found by the natives in the Waiapu river, and were collected by them for the purpose of cutting up and attaching to their fish-hooks, in order to fish. The portion of *tibia* which I obtained had been sawn across by the native in whose possession it was, for that purpose. I also obtained several hooks, each having portions of *Moa's* bone attached to it. I could not however ascertain, from the smallness of the slips, whether these had been originally cut out of such bones as those I had just procured, or whether they had not been sawn from bones of a different description and larger size.

Leaving Waiapu, and proceeding by the coast towards the south, I arrived at Poverty Bay, where the Rev. W. Williams resided. This gentleman had had the good fortune to procure a nearly whole *tibia* of an immense bird, without however the entire processes of either end. This bone measured about 18 inches in length, and was proportionably thick. Mr. Williams wishing to send this unique relic to Oxford, I left a pair of *femora* to accompany it, in order, if possible, to obtain from that seat of learning some light on these increasingly interesting remains. At Poverty Bay I made several inquiries after *Moa* bones, but to little purpose, as I could not obtain any.

Quitting Poverty Bay, and still travelling in a southern direction, I soon came within sight of Wakapunake, the mountain celebrated as the residence of the only surviving *Moa*. As natives lived about its base, among whom my route lay, I looked

forward with no small degree of interest to the obtaining at least some *Moa* relics in this locality; in this however I was disappointed. At the close of the second day's travel we arrived at "Te Reinga" (a village situated at the foot of the mountain), where, as opportunity offered, I inquired of the natives relative to the *Moa*. In reply to my reiterated queries, they said that he lived there in the mountain, although they had never seen him, but that the *Moa* bones were very commonly found after floods occasioned by heavy rains, when they would be washed up on the banks of gravel in the sides of the rivers and exposed to their view; still they had not any at that time by them. I offered large rewards for any that should be found hereafter, and which were to be taken to Mr. Williams at Poverty Bay. Here, as at Waiapu, no one person could be found who possessed the hardihood positively to assert that he had seen the *Moa*, although this neighbourhood had ever been the dwelling-place of that tribe. The mountain, too, it appeared was by no means unknown to them; for, during a war between themselves and the Urewera tribe a few years ago, they had fled for refuge to their stronghold on the top of Wakapunake, where they had lived for some time, and where many of their relatives eventually fell into the hands of the enemy, who starved them into a surrender and took the place. Here then was still further proof (if proof was wanting), that no such colossal animal could possibly at this time be *existing* in this place. The spot, however, was well-chosen for the fiction of such a creature's residence: a huge, table-topped and lofty mountain, covered with primæval forests of gloomy pines; its brow singularly adorned with a horizontal stratum of whitish sandstone, which ran continuously and precipitously for more than two miles. At the base of the mountain ran the river Wangaroa, down which we paddled in canoes for some distance. This river is a branch of the Wairoa river, which disembogues into Hawkes' Bay.

These natives further informed me that a *Moa* resided at a certain high mountain in Te 'Waïti district, nearly five days' journey into the interior, in a N.W. direction from the place where we now were, and that *there* I should find people who had actually seen the animal. If I was little inclined to believe in the story of its existence before, I was much less inclined to do so now; however, as my route lay that way, I determined to make every possible inquiry after it.

Fifteen days after this I arrived at Te 'Waïti, the principal village of that district and not far from the residence of the second *Moa*. Here however, as before, the people had never seen a *Moa*, although they had always heard of, and invariably believed in, the existence of such a creature at that place. They,

too, had not any bones in their possession; though such, they said, were very commonly seen after heavy floods. The following day I passed close by the mountain where this *Moa* had resided for so many years, but noticed nothing more than usual (although I availed myself to the utmost of the use of my pocket telescope), save that this part of the country had a much more barren and desolate appearance than any I had hitherto witnessed.

I returned in the autumn to the Bay of Islands, without gleaning any further information relative to the *Moa*.

It should however appear (from information which I have recently received from the Rev. W. Williams), that very shortly after my leaving Poverty Bay, a *Moa* bone was brought him by a native which he immediately purchased. The natives in the neighbourhood hearing of a price being given for such an article as a bone, which they had ever considered as of little worth, were stimulated to exertion, and a great number, perhaps more than a hundred persons, were soon engaged in the field, actively searching after *Moa* bones; the result was, that Mr. Williams soon had the pleasure of receiving a large quantity of fossil bones, some of which were of an enormous size, and in a good state of preservation. The bones, though numerous, were not in any great variety, chiefly comprising such as I have already mentioned, i. e. those of the *femur* and *tibia*, together with those of the *tarsus*, the lower part of the *dorsal vertebræ*, and a portion of the *pelvis*. Altogether, the bones of nearly thirty birds, apparently of one species only, must have been brought to Mr. Williams. From the great difference in the sizes of some of them when compared with each other, Mr. Williams came to the conclusion, that the animal to which they once belonged must have been very long-lived. Whilst, however, I do not perceive how far this inference is to be correctly deduced from the mere difference in the size of the bones, we know that longevity is common to very many of the feathered race, particularly to those of the larger kinds. One of the bones, a *tibia**, measured 2 feet 10 inches in length, and was proportionably thick. Two others measured, each, 2 feet 6 inches in length. Another, a section of a *femur*, measured 8 inches in circumference in the smallest part! On putting together the bones of the leg and thigh (although none of them exactly fitted), and making the necessary allowance for the portions deficient of the processes of the joints, the intermediate cartilages, and lower tendons and integuments of the foot, we obtain at least six feet of the lower extremities of a bird; which, supposing its upper parts to accord in size with the lower ones, must have measured in altitude when

* This has been sent by Mr. Williams with several others to Prof. Buckland.

alive, at the lowest rate of calculation, from 14 to 16 feet!! An enormous feathered monster, well worthy, from its gigantic size, of being classed with the *Megalosaurus* of Buckland and the *Mastodon* of Cuvier.

It so happened that about this time a mechanic, who had been living at Cloudy Bay in the Middle Island, came to reside at Poverty Bay. He stated that this bird now existed in the high hills near Cloudy Bay; and that two Americans, residents at that place, hearing from a native that such a bird lived on the mountainous and snowy heights, provided themselves with arms, and thus equipped, went in high expectation of shooting one, taking the native with them as their guide. They ascended the mountain to the place where these birds resort, and, at the native's request, hid themselves behind some bushes. Presently they saw the monster majestically stalking down in search of food; they were, however, so petrified with horror at the sight as to be utterly unable to fire on him. They observed him for near an hour, ere he retired, and were glad enough at last to make their escape. They described this animal as being about 14 or 16 feet in height.

The bones from which the annexed drawings* were made, were all found at Turanga (Poverty Bay). They comprise a *tibia*, a *femur*, a *tarsus*, and fragments of a *pelvis* and *dorsal vertebra* of a *Moa*. They are very stout, are deeply marked with muscular impressions, and are in a good state of preservation. 1. The *tibia*, which is nearly perfect, measures 30 inches in length, and in girth, at the largest end, (where it was much broken away at the edges of the processes, and consequently reduced in size,) $16\frac{1}{2}$ inches; at the smallest end $12\frac{1}{2}$ inches, and in the smallest part, near the middle of the bone, $5\frac{1}{4}$ inches. There are not any remains of a fibula, however rudimentary, attached to the tibia, nor is there any apparent mark of attachment to indicate that such formerly adhered thereto. The largest tibia yet found in nearly a perfect state, measured 4 inches more in length than this†. 2. The *femur*, which also is nearly perfect, measures in length 13 inches; in girth, at the one end over the head of the femur, $11\frac{1}{4}$ inches, at the thickest end $12\frac{1}{2}$ inches, and in the smallest part $5\frac{1}{2}$ inches: the reticulated muscular impressions on this bone are very numerous and well-defined. I have seen a portion of a femur, the small part of which measured

* Drawings of these bones were sent to the Tasmanian Society, together with the original monographs.

† I much regret that I had not an opportunity of inspecting the largest and most perfect bones ere they were sent to England. A vessel sailing from Turanga for Port Nicholson, by which opportunity they were sent, was the reason of my not seeing them.

in girth 8 inches! 3. The *tarsus* (a small one), nearly perfect, measures in length 10 inches, and in girth at one end 9 inches, and at the opposite end 8 inches, and in the smallest part 4 inches: this bone is comparatively very short and flat, and has articulations for only three toes. 4. The portion of the *bone of the back and pelvis* is not so perfect, being a much-broken fragment, comprising from the upper outer edge of the *acetabulum* of the *os innominatum* to the lower joint of the *dorsal vertebræ*, in which the canal for the *medulla spinalis* is perfect. This bone, or rather fragment, measures, from the outer edge of the reticulation of the head of the *os femoris* to the outer broken edge of the bone (which is that portion approaching towards the upper part of the bone of the *pelvis*), 11 inches; and across the inner and smallest part of the bone, immediately beneath the last of the *dorsal vertebræ*, where it was most perfect, 7 inches: a correct idea cannot however be given of such a fragment as this, through the medium of a written description. This bone evidently differs very considerably from such bones in other birds, in its peculiar carinated shape in that portion of it which must have formed the highest part of the lumbar region; it must have been also considerably larger when entire, as the whole of the upper ridge is much broken. This bone is also very deeply indented with muscular impressions.

Having thus given, it is to be feared, rather a tedious detail of the *Moa*, and of the bones hitherto found, little more remains, at present, for the writer, than deferentially to offer a few remarks on the bones in question; and these suggestions which he has to submit may be noticed under two general heads. First, does the *Moa* now exist? or, at what period of time is it probable that it existed? Secondly, to what order or family can we reasonably suppose the *Moa* to belong?

It is very true that at this time we have but little to assist us in our search; nevertheless, let us commence and prosecute our inquiry, judiciously considering such aids as may present themselves to our notice in the course of our investigation at all bearing on the subject before us.

Our first inquiry then will be, does the *Moa* now exist? or, at what period of time is it probable that it did exist? To the first of these queries I reply, that it is my opinion that the species of bird whose bones we have now before us does no longer exist, at least in New Zealand: a few reasons for this opinion of mine I will here adduce.

From my knowledge of the New Zealander, I can but believe that there is no part of his native land which has not been trod by him, at one time or other, however mountainous or dreary it may be. As a proof of this, I might mention their having pro-

per names for every portion of land and water, whether hill or dale, lake or running stream; and their never being at a loss in describing distant or unfrequented parts of their own country, some one or other present among the "listening crowd" having either visited the places spoken of, or received a narration from some one who had. Now, as no New Zealander is to be found who can positively state that he has actually seen such a bird, and as every nook and corner of the land is well known to the natives, I conclude that the animal in question no longer exists in New Zealand. In recording this opinion, it will be seen that I pay no attention whatever to the strange and fearful account given of the *Moa* by some natives, a relation which carries with it its own proof of being false; as I know full well the *powers* of the New Zealander for romance, of which description of stories they have not a few among them. The account, too, furnished the Rev. W. Williams from the two American settlers, I also, in like manner, reject; but only as far as the bird whose bones we have before us is concerned. A very large and peculiar bird *may* exist in the mountainous district of the Middle Island; in fact, we know that several large birds well known to the natives, though hitherto unknown to science, live on the high hills in the Northern Island. But I cannot persuade myself to receive one man's relation as perfectly correct in every particular, against the united testimony of those persons from among the different tribes of the Northern Island with whom I have conversed on the subject; that person, too, an unscientific man, receiving his relation from others, who, by their own account, were not only powerfully operated on by fear, but who are also from that country in the "far west" whose natives are proverbially famed for their "long yarns."

In thus, however, disposing of that part of the question relative to the *present* existence of the *Moa*, we have still to inquire, at what period of time is it probable that this bird existed? And here, I think, we have to consider, first, the situation in which the bones are found; and secondly, any additional evidence which native tradition may be able to afford us.

The *Moa* bones, as far as I have been able to ascertain, have hitherto been only found within the waters and channels of those rivers which disembogue into the southern ocean, between the East Cape and the S. head of Hawkes' Bay, on the E. coast of the Northern Island of New Zealand. And, as I have before observed, they are only, when wanted, sought for after floods occasioned by heavy rains, when, on the subsiding of the waters, they are found deposited on the banks of gravel, &c. in the shallowest parts of the rivers. These rivers are, in several places, at a considerable depth below the present surface of the soil,

often possessing a great inclination, at once perceived by the rapidity of their waters. They all have more or less of a delta near their mouths, from a slight inspection of which it is known that their channels have, in those places at least, considerably changed. The rocks and strata in these localities indicate generally both secondary and tertiary formations; consisting, the former of argillaceous schist, sandstone, conglomerate, greensand, &c.; the latter of clay, marl, calcareous tufa, sand, gravel, and alluvial deposits. The real depositum, however, of the *Moa* bones is not certainly known.

From native tradition we gain nothing to aid us in our inquiries after the probable age in which this animal lived; for although the New Zealander abounds in traditionary lore, both natural and supernatural, he appears to be totally ignorant of anything concerning the *Moa*, save the fabulous stories already referred to. If such an animal ever existed within the times of the present race of New Zealanders, surely, to a people possessing no quadruped*, and but very scantily supplied with both animal and vegetable food, the chase and capture of such a creature would not only be a grand achievement, but one also, from its importance, not likely ever to be forgotten; seeing too that many things of comparative minor importance are by them handed down from father to son in continued succession, from the very night of history. Even fishes, birds and plants, (anciently sought after with avidity as articles of food, and now if not altogether, very nearly extinct,) although never having been seen by either the passing or the rising generation of aborigines, are, notwithstanding, both in habit and uses, well known to them from the descriptive accounts repeatedly rehearsed in their hearing by the old men of the villages. This very silence, however, I embrace as a valuable auxiliary evidence, bearing me out not a little in my conjecture, that the bones of the *Moa* will probably be found lying either in the upper stratum of the secondary or the lower strata of the tertiary formation. In fact, unless we suppose this immense bird to have existed at a period prior to the peopling of these islands by their present aboriginal inhabitants, how are we to account for its becoming extinct, and, like the *Dodo*, blotted out of the list of the feathered race? From the bones of about thirty birds found at Turanga in a very short time and with very little labour, we can but infer that it once lived in some considerable numbers; and, from the size of those bones, we conclude the animal to have been powerful as well as numerous. What enemies then had it to contend with in these islands, where, from its colossal size, it must have been para-

* See Note D., Appendix.

mount lord of the creation, that it should have ceased to be? Man, the *only* antagonist at all able to cope with it, we have already shown as being entirely ignorant of its habits, use, and manner of capture, as well as utterly unable to assign any reason why it should have thus perished.

The period of time then in which I venture to conceive it most probable the *Moa* existed, was certainly either antecedent or coetaneous to the peopling of these islands by the present race of New Zealanders.

But we will proceed, and endeavour to ascertain (as we proposed in the second place to do) to what order or family is it likely that the *Moa* belongs? In making this inquiry, we have little to assist us but the bones before us; from an attentive consideration of which we are necessarily led to conclude that the animal must have been of large size and great strength; and, from the shortness of the *tarsus* (when compared with the length of the *tibia*), we also perceive it to have been short-legged. From its size, we shall naturally be led to seek for its affinities among either the *Raptorial* or *Rasorial* orders; but from its *tarsi* possessing only articulations for three toes, we are at once precluded from supposing that it belonged to the former order; to which we may also add, *first*, the (so to speak) evidence of negation, of not a single specimen or fragment of a wing-bone having yet been found; and, *secondly*, the judicious observation of Cuvier (in reference to the family of *Struthionidæ*), that it would be morally impossible to fit such heavy bodies with wings sufficient to enable them to fly*. In the latter, however (the Gallinaceous or Rasorial order), we have the largest and stoutest birds known; these too are terrestrial in their habits, some exclusively so, and very often possess only three toes. It is true, that in general the different known members of the family containing the largest birds have their *tarsi* long, (whereas those of the *Moa*, as we have already seen, are short,) yet to this we have exceptions in the *Dodo* (alas! no more) and the *Apteryx*. And I think it is highly worthy of notice, that the latter, the only known existing genus of the family possessing short *tarsi*, is entirely confined to these islands.

From a conviction, then, that it is in this order only that the affinities of the *Moa* are to be sought with any prospect of suc-

* The Baron's words are, "It appears as if all the muscular power which is at the command of nature would be insufficient to move such immense wings as would be required to support their massive bodies in the air."—'Règne Animal,' Class Aves, ord. 5. fam. 1.—If such were the spontaneous remarks made by that illustrious naturalist on contemplating the size of the known members of that family, what would he not have said, had he but lived to examine the colossal structure of the *Moa*!

cess, and that it is in the family *Struthionidæ* where they will, doubtless, eventually be found, we are induced, for the present at least, to place the *Moa* in that gigantic group. In the absence, however, of a specimen of an *Apteryx** with which to compare the few bones we at present possess of the *Moa*, I should, I confess, be hazarding an opinion in saying that it was most nearly allied to that peculiar genus; yet when we consider, that out of the *five* existing genera of this family, three at least, apparently possessing the nearest affinities to the remains of the bird before us, belong exclusively to the southernmost parts of the southern hemisphere†, and that a connecting link is, as it were, wanting between the *Rhea* of the Straits of Magellan, the *Dromiceus* of New Holland, the *Casuarius* of the Indian Archipelago, and the *Apteryx* of New Zealand, and that this connecting link *may*, in all probability, be supplied in the *Moa*; I think we shall be constrained to assign our *Moa* a place between the genera *Casuarius* and *Apteryx*, possessing as it does (only in a much greater degree) the immense size and strength of the former, combined with the short tarsi, and probably wingless structure of the latter.

I venture however to suppose, that we may gain an additional gleam of light, both upon the probable period at which the *Moa* existed, and also on the family to which it may be allied, by a consideration of the etymology of its name. The word *Moa*, whence is it derived? I confess, I know not any New Zealand word from which it may be supposed to have derived its origin. And this will seem the more remarkable when we consider, that a very great number of New Zealand appellatives are not only derived and easily traceable, but are also generally highly expressive of some action or quality of the thing itself; chiefly too is this to be observed when such action or quality is peculiar or uncommon. But in the *Moa*, the most uncommon animal New Zealand has ever produced (especially in the estimation of a native), we have a cognomen which seems an entire exception to the common rule; for, as far I understand it at present, it has, in reference to this immense animal, no meaning whatever. Further, it may not be amiss also to notice *en passant*, that it is of rare occurrence in the language to find anything bearing so very *short* an appellative as the bird in question. In the Friendly, Society, and Sandwich groups, the term "*Moa*" has been, I believe, invariably given by the natives of those islands to the domestic cock, and used as the proper

* It has been my good fortune to have at different times several specimens of the *Apteryx* in my possession; at present, however, I have not one, nor do I know in whose possession one is to be found in New Zealand.

† See Note E., Appendix.

name for that animal by the missionaries there. The New Zealander, in relating his fabulous account of the *Moa*, almost invariably said, it was like a "*tikaokao*," i. e. a cock, (they having given the cock that name from its crow, which to them sounded like those letters when drawn out and pronounced after their manner,) and that it was adorned with wattles, &c. Without at all, at present, entering into the question as to what country or countries the existing race of New Zealanders emigrated from to these islands, the popular belief, that at least a portion of them is of Malay origin, is, I think, in connexion with the name of this bird, worthy of notice; for whilst we know the term "*Moa*" is used to denote the cock in the Friendly Islands and other groups, it is only in the isles of the Indian Archipelago that the cassowary (*Casuarius Casoar*, Briss.) is to be found, and this bird too is "heavy and stoutly built," and the only one of the whole family of *Struthionidæ* possessing wattles; for, according to Cuvier, it "has the skin of its head and top of the neck naked, of an azure-blue and fiery-red colour, with pendent caruncles like those of the turkey, and is the largest of all birds next to the ostrich*." May we not, I would ask, be allowed to conjecture, that in that now long-past period, when the forefathers of the present race of aborigines first landed on these shores, a few of those New Zealand birds might still be found in the most secluded and mountainous retreats, having hitherto escaped the repeated inroads of the original inhabitants (or, we may suppose that the bones only were seen and identified to belong to a bird by those new-comers), to which, from their real or supposed resemblance to those of the cassowary, they gave the name of *Moa*; the name which that giant bird bore in their fathers' land?

This conjecture, however, may be much more fully established, on ascertaining the name by which the cassowary is known to the present inhabitants of the islands of the Indian Sea.

The ornithology of New Zealand, now that these islands are become a British colony, will soon be known; and we may rest assured, that *if* such an animal exists, it cannot much longer remain concealed. And, it is further to be hoped, that ere long we shall be enabled to find somewhat more of the fossil remains of the *Moa*, so as not merely to form in part conjectural opinions on its size, habits and affinities, but so as to be well assured of what this prodigious creature really was.

WILLIAM COLENSO.

Paihia, Bay Islands, New Zealand, May 1, 1842.

* Vide Cuvier, 'Règne Animal,' class Aves, gen. *Casuarius*.

APPENDIX.

Note A., page 81.

The *Tuatara* is an animal belonging to the class *Reptilia*, order *Sauria*; but to which of the families composing the same, I cannot, in the absence of books of reference, at present determine. It appears to possess characters common to *Lacertinidæ* and *Iguanidæ*, in its having the thin and extensible tongue of the former, combined with the undivided one of the latter. It is common in some parts of New Zealand, particularly on rocky headlands and islets lying off the coast. I have one at present in spirits, which I had alive for nearly three of the winter months; during which time, although I repeatedly tried to get it to take some kind of food, I could not succeed. From its habits I supposed it to be a hybernating animal. It measured 19 inches in length, had a row of elevated spines (or rather recurved scales) nearly the whole length of its back, and appeared a perfectly harmless creature. It was taken, with two others, on Karewa islet, off Tauranga harbour, in the Bay of Plenty. The natives speak of another species possessing a forked tail! and assert that a larger species, which inhabits swampy places, has been seen six feet in length, and as thick as a man's thigh. The largest, however, that I have ever heard of did not measure above two feet in length.

Note B., page 82.

The shells of several species of *Haliotis*, *Ostrea*, and other nacrescent genera, are commonly used by the natives inhabiting the isles of the South Pacific for this purpose. A narrow slip of the shell is firmly fastened to the back of the hook, the barb of which is generally concealed by a tuft of metallic-surfaced blue feathers, procured either from the Korora (*Aptenodytes minor*) or the Kotaretare (*Dacelo Leachii*). The hook thus prepared and attached to a stout line, composed of the fibres of the Korari (*Phormium tenax*), which, after being cleaned from the parenchymatous parts, are twisted together with the hand, is drawn quickly through the water by a person paddling a small canoe; the larger fish, believing this glittering lure to be their prey, eagerly pursue it, and greedily catching at the same are taken. In favourable weather a great number of fine fish are soon captured by this method. Among the New Zealanders it is a very favourite sport, and one that is not a little animating, when several canoes are engaged. I have seen upwards of twenty small canoes thus employed on a fine summer's evening, on the beautiful sheet of water in the Bay of Islands. I may here mention, that previous to the introduction of the Gospel among the New Zealanders, their hooks were often composed of human bone; those of their enemies being used for that purpose. Sometimes they formed their hooks from the tough stalks and branches of Tauhinu (*Pomaderris ericifolia*) and Mangemange (*Lygodium volubile*), hardening them by the aid of fire. At present they invariably prefer the hooks which they make from iron nails to those of our manufacture, the latter, they allege, being much too brittle.

Note C., page 82.

Whoever has read the marvellous 'Thousand-and-one Nights' must be well acquainted with the monstrous stories related of this extraordinary bird; its celebrity, however, is not confined to that work. "*Rukh*," says the author of the Arabic Dictionary, "is the name of a monstrous bird which is said to have powers sufficient to carry off a live rhinoceros." To this animal Marco Polo also refers, in his relation of the story of the ambassadors:—"The *rukh* is said, by persons who have seen it, to measure sixteen paces across the wings from tip to tip, the feathers of which are eight paces in length, and thick in proportion. A feather of the rukh was brought by those messengers who were sent by the Grand Khan for the purpose of making inquiries respecting it, which feather is positively affirmed to have measured ninety spans, and the quill part to have been two palms in circumference." The existence of this immense bird seems to have obtained universal credence throughout all the eastern nations; and while ancient historians make mention of certain enormous and peculiar animals as common to the Orientals, scientific men of modern times have wisely omitted such relations from their nomenclature.

Note D., page 89.

The only quadrupeds indigenous to New Zealand are a dog, a small rat, a few Saurians, a bat, and on the coast, one or two species of seal. The dog (*Kuri**) is a small animal (somewhat resembling the variety known as the *pricked-ear shepherd's cur*) with erect ears and flowing tail; its cry is a peculiar kind of whining howl, which, when in a state of domestication, it utters in concert at a signal given by its master, and is most unpleasant. Of the skins of these animals the New Zealanders make a durable garment, which when composed of alternate strips of black and white fur has a handsome appearance. Its flesh was formerly eaten. This variety of dog has however become very scarce in consequence of the continued introduction of other and larger varieties.

The rat (*Kiore*) is a small field species of *Arvicola*, Cuv., now seldom met with. Its place unfortunately is more than supplied with the common species of *Mus* (*M. musculus*, *M. rattus*, and *M. decumanus*†), which everywhere abound, to the infinite annoyance of

* The natives have several names for the dog in addition to that of *kuri*, such as *moimoi*, *kirehe*, *peropero*, and the general appellative of *kararehe*. M. Balbi, 'Introd. à l'Atlas,' p. lxix, mentions *pero*, the New Zealand term for dog, as being derived from the Spanish *perro*, and as affording a proof that the animal was originally of foreign introduction, and obtained in comparatively recent times; the natives however invariably assert their always having had this animal among them.

† These species are severally distinguished by the natives: the indigenous animal is termed *kiore maori* (i. e. native rat); *M. musculus*, *kiore iti* (i. e. little rat); *M. rattus*, *kiore mangu* (i. e. black rat), or *kiore pakeha* (i. e. foreign rat); and *M. decumanus*, *maunga rua* (i. e. barn abider.)

the natives. The indigenous species was used as an article of food by the New Zealanders, being when fat in high repute as a delicious *morceau*.

Of the order *Sauria*, at least six distinct species are now in my possession. They are all (with the exception of the *Tuatara* already mentioned) small animals. Two beautiful species, one a light green with a long tail, the other a darker green, with white oblong and subreniform spots, are called by the natives *Kakariki* and *Kakawariki*. These are often found basking in the sun stretched on the upper branches of some shrub. Two other species of an ash colour, elegantly marked with gray and brown waterings, called by the natives *Pàpà*, are found in rotten and hollow trees. These four species are broad and flat, and have small scales which are not imbricated. Two other graceful species, with bodies much narrower and more elongated, of a brown colour with numerous light and dark coloured markings and dots, are called by the natives *Mokomoko*. One of these last-mentioned species is very common, and may be obtained in abundance in the summer season on the shores among the dry algæ and other light substances a few feet above high-water mark. The other of these last-mentioned species is very scarce, I having only casually seen it in decayed trees in forests. All the species are harmless, and are objects of superstitious dread to the New Zealander; chiefly so however to the old and ignorant. The flesh of the *Tuatara* alone is made use of by the natives as an article of food; only however by one or two tribes inhabiting the interior of the island, for which they have been often spoken contemptuously of by their countrymen.

The bat I have never had an opportunity of closely examining. It is however a small species, and like its European relative, is commonly seen flitting its tortuous maze on a fine summer's evening. The natives call it *Pekapeka*.

The seals (*Phocæ*) I have never seen; they are, nevertheless, well-known to the natives, who call them *Kekeno*, and assert that they come on shore at night to browse on thistles! When captured, as they sometimes are, they afford the New Zealander a rich repast. They in all probability comprise the species *Ph. leptonyx*, Blainv., and *Ph. leonina*, Linn.

Pigs, dogs, cats, rats and mice are now both wild and numerous throughout the whole island. Even the dense forests of the interior, far away from the residence of men, are infested with the smaller vermin. The natives attribute the destruction and all but extinction of the Kiwi (*Apteryx australis*), the Koitareke (a species of *Tetrao*), the *'Weka* (a large and unknown bird with short wings, probably allied to the genus *Ardea*), the *Kiore maori*, and other terrestrial animals, to the voracity and numbers of those foreign pests.

Note E., page 91.

It may not be amiss to give here an outline of the genera composing the family of *Struthionidæ*, seeing they are but few. Each

genus contains but a single species. In the present state of our knowledge the group may be thus arranged:—

Class AVES.

Order IV. Rasores, Vigors.

Family IV. Struthionidæ.

1. Genus *Struthio*, Linnæus. (Type of the group), *Ostrich* of South Africa: possessing two toes.
2. Genus *Casuarius*, Brisson. *Cassowary* of the Indian Archipelago: three toes.
3. Genus *Dromiceius*, Vieillot. *Emeu* of N. S. Wales: three toes.
4. —— *Rhea*, Vieill. *Nandu* of Straits of Magellan: three toes.
5. —— *Didus*, Linn. *Dodo*, formerly an inhabitant of the Isles of Mauritius and Bourbon: three toes: extinct!
6. Genus *Apteryx*, Shaw. *Kiwi* of New Zealand: three toes and a rudimentary one.
7. —— ——? ——?* *Moa* of New Zealand: three toes: supposed to be extinct.

XIII.—*On some British species of* Œnanthe. By Charles C. Babington, M.A., F.L.S., F.G.S. &c.†

My friend Mr. Ball having most kindly allowed me to read his paper upon *Œnanthe* (p. 4 of the present volume) before its publication, I have availed myself of his permission, and prepared the present memoir upon the same subject, which, it will be seen, is one which presents very considerable difficulty.

To my valued friend the Rev. W. L. P. Garnons I am indebted for specimens of *Œnanthe* from "a marsh between Weymouth and Portland Island" which agree very well with Mr. Ball's description of *Œ. pimpinelloides*, but want the radical leaves. All the stem leaves that remain (the lowest alone being wanting) have linear simple pinnules. The diachenia are unripe, as is also unfortunately the case in all my foreign specimens of *Œ. pimpinelloides*; but still they show a considerable difference of form from those of *Œ. Lachenalii*, narrowing in a slight degree from the summit downwards, and being furnished at the base (as far as I can judge from unripe dried specimens) with the fleshy prominent ring found in the true *Œ. pimpinelloides*; they are crowned with the erect persistent limb of the calyx, and about equal the length of the rigid, slightly divergent styles. The leaflets of the involucels differ slightly in form and proportions, being linear-subulate or

* Prof. Owen's observations on this subject are given at p. 444, vol. xii., and p. 59, vol. xiv. of this Journal; the generic name of *Dinornis* has been assigned by Prof. Owen to this monster bird, and no less than five species distinguished.—Ed.

† Read before the Botanical Society of Edinburgh, 9th May, 1844.

almost setaceous on one of the specimens from Mr. Garnons, but linear-lanceolate on the other; and in both cases shorter than the outer barren pedicels. On the Toulouse specimen of *Œ. pimpinelloides*, gathered and named by M. Serre, and already referred to by Mr. Ball and myself (Man. 130), the involucels have linear-subulate leaflets which are shorter than the outer pedicels; whilst on another from Dr. Noe, found near Fiume (Reich. Fl. Germ. exsic. 1359), those organs are very narrow and extend beyond the barren florets. I think therefore that the character drawn from the involucels can hardly be depended upon, and that the differences between this plant and *Œ. Lachenalii* must be founded upon their very different roots, the remarkable callosity at the base of the diachenium, and the mucronate pinnules of all its leaves. Owing to the absence of the radical leaves and of ripe fruit, I cannot absolutely say that the Weymouth plant is *Œ. pimpinelloides*, although I have great reason to believe it to belong to that species. Its root consists of long fibres abruptly enlarged at about two-thirds of their length into nearly spherical knobs. Although these specimens must remain slightly doubtful, those which are referred to by Mr. Ball seem to admit of no ambiguity, and will therefore add the true *Œ. pimpinelloides* to the flora of Britain.

Œ. peucedanifolia of Smith presents much more difficulty than we have met with in the consideration of the preceding plant, owing to the probability that more than one species is included under the name of *Œ. silaifolia*; for its root keeps it distinct from the *Œ. peucedanifolia*. If we examine the works of authors of authority who have described plants under the name of *Œ. silaifolia*, we find the following differing descriptions, viz. "napulis radicalibus fasciculatis oblongis," *Bertoloni* (Fl. Ital. iii. 241); "radice fasciculata fibris oblongo- vel elongato-clavatis," and "fructibus cylindricis basi callo cinctis," *Koch* (Syn. Fl. Germ. ed. 2. 322); "radicis fibris oblongo-fusiformibus tuberosis cylindricisve" and "fructibus ovatis," *DeCandolle* (Prodr. iv. 137); "radicis fibris cylindrico-fusiformibus," *Reichenbach* (Fl. excurs. 463); "radicis fibris cylindraceo-fusiformibus," *Bluff* and *Fingerhuth* (Comp. Fl. Germ. ed. 2. i. 495); "tuberibus fusiformibus," *Bieberstein* (Fl. Tauro-Cauc. iii. 232). Taking the last as the plant to which this name correctly belongs, we find the descriptions by DeCandolle, Reichenbach, and Bluff and Fingerhuth, and the figure in 'Eng. Bot.' (tab. 348), to agree with it in the form of the thickened fibres of the root; but none of these authors give any useful description of the fruit except DeCandolle, who calls it "ovate;" and as in other species he speaks of the callous ring at the base, it is clear that he does not understand it to be present in this plant. It seems then that Smith's *Œ. peuceda-*

nifolia must be referred to *Œ. silaifolia* (Bieb.) until it can be shown that the fruit is different. Owing to the want of authentic specimens of Bieberstein's plant, and of ripe fruit of Smith's, I am unable to do this, although it will be seen below that several authors consider it to possess a totally different form from that described by DeCandolle. The descriptions published by Bertoloni and Koch remain to be considered, and it will be seen that they both describe the root in such a manner as to convey the idea of a quite different form of fibre from that possessed by the plant of Bieberstein; but that in their account of the fruit, totally different plants must be intended.

I now come to the latest author who has written concerning these plants, namely Grisebach. In his 'Spicilegium Floræ Rumelicæ et Bithynicæ' (i. 352—357) he has described several new species of *Œnanthe*, and appended a tabular synopsis of all the European species belonging to the genus. Here we find that *Œ. media* (Griseb.) has "radicis napulis sessilibus oblongis utrinque attenuatis," and "fructibus cylindricis . . . . . annulo calloso ad basin cinctis;" and he afterwards adds, that it is "species media inter *Œ. peucedanifoliam* (Poll.), quacum foliis et petalis convenit, et *Œ. silaifoliam* (M. B.), cujus fructum radicemque imitatur." Here then we have an express declaration that the true *Œ. silaifolia* has roots similar to Sowerby's figure in 'Eng. Bot.,' but that its fruit has the enlarged callous ring at the base.

Concerning *Œ. peucedanifolia* there is very little difference of opinion; most authors considering it to possess sessile, more or less clavate radical knobs, which contract abruptly into a long slender fibre, and fruits which are narrowed at the base.

If now we refer to Mr. Ball's description of his specimens named *Œ. silaifolia* from Portmarnock and Deerhurst, we find that they possess oblong-clavate radical knobs terminating in a fibre—a structure which I consider to belong to the *Œ. silaifolia* of Bertoloni and Koch, but not of Bieberstein, and the *Œ. peucedanifolia* of most authors—but then he describes the fruit as "clavatum inferne quidquam contractum." In both these respects, therefore, it would appear that his plants might have been considered as the *Œ. peucedanifolia*, had he not stated that all their leaves are similar, the leaflets of the lower leaves being lanceolate and of the upper ones linear, which I believe not to be the case in *Œ. peucedanifolia*. Thus his plant is not *Œ. peucedanifolia* from its leaves, not *Œ. silaifolia* of Bieberstein, DeCandolle, Reichenbach nor Bluff, from its root. It is probably the plant of Bertoloni but not that of Koch, if "the presence or absence of the incrassated summit of the pedicel," by which I understand what most authors call the callous ring at the base of the fruit, "is never seen to vary."

I now proceed to notice two English plants contained in my own herbarium, but previously take the opportunity of suggesting that, as it is not improbable that the form of the radical knobs varies in different states of the same plant or at different seasons of the year, it would be advisable that they should always be examined at the same stage of the plant's development, namely, when the fruit of the primary umbel is well-formed but the secondary umbels still bear flowers. One of my English specimens was gathered ten years since at Cambridge, and unfortunately does not possess the root or fruits; in other respects it agrees pretty well with Mr. Ball's description of *Œ. silaifolia*, although not quite with sufficient exactness to allow me to state with certainty that they are the same plant. The other English specimens in my possession have been given to me by the Rev. A. Bloxam, by whom they were gathered at Sutton Wharf in Leicestershire. These possess the roots of *Œ. peucedanifolia*; the radical and lowest stem leaves are absent, but all the others have short, linear, acute segments, and the lower ones are bipinnate, whilst the upper are nearly, and the uppermost quite, simply pinnate. Unfortunately the fruit is very young, but yet shows very decided marks of having a thickened base. On the whole, I am inclined to consider all my English specimens as referable to the *Œ. silaifolia* of Koch but not of Bieberstein.

From the above it seems to me that we are authorized to conclude that more than one species passes under the name of *Œ. peucedanifolia* of Smith, and I trust that I may venture to ask English botanists to favour me by the communication of specimens possessing both fruit and roots, in order to enable me to endeavour to clear up this difficulty in a future edition of my 'Manual of British Botany.'

The root of *Œ. Lachenalii*, which, as Mr. Ball justly observes, is by far the most common of these plants in Britain, appears to differ considerably according to the state of the plant; young seedlings and the offsets of old plants having slender branched fibrous roots. On flowering plants the fibres are simple, stout, and pretty uniformly thick throughout the greater part of their length; not clavate nor fusiform, nor nodulose. The radical fibres of fruiting individuals usually thicken gradually, but not very greatly through a considerable portion of their length, and are then narrowed quickly, but not abruptly, into the slender fibrous extremity. Old plants which, late in the autumn, have perfected their fruit and are dying down to the ground, have their radical fibres irregularly thickened throughout at least half of their length, not at all clavate, and too irregular to deserve the name of cylindrical or fusiform.

I have but little objection to make to Mr. Ball's description of

Œ. Lachenalii, but find the lowest leaves to be occasionally even tripinnate, and the leaflets are quickly rounded off at the end to an acute angle. I suspect that Mr. Ball is not acquainted with the radical leaves of seedling plants or young offsets: they are once or twice pinnate, with ovate or wedge-shaped, obtusely inciso-apiculato-crenate segments.

It only now remains for me to add, that I fully concur with my friend in the observations with which he concludes his paper, but think that the position, form, and relative size of the radical knobs are of more value for the discrimination of species than they appear to possess in his estimation.

St. John's College, Cambridge, April 25, 1844.

XIV.—*On* Cardinia, *Agassiz, a Fossil Genus of Mollusca characteristic of the Lias.* By H. E. Strickland, M.A., F.G.S.

There are few groups of fossils which, both in their generic and specific relations, have been involved in greater confusion than the very natural and characteristic genus of which I am about to speak. Having resided for some years in a locality where several species of this genus abound, and having, by the examination of many hundreds, I might say thousands of specimens, aided by the kindness of Mr. J. Morris, author of the valuable 'Catalogue of British Fossils,' been enabled to trace them through their several varieties, and thus to circumscribe the boundaries of the species, I hope to correct some of the errors into which other authors have fallen.

The genus of Mollusks in question is evidently most nearly allied to *Astarte*, Sow. (*Crassina*, Lamarck), a genus which most authors agree in placing among the *Veneridæ*. From the great strength of the shell, single valves are often preserved in a perfect state, and we are thus enabled to ascertain all its characters with an accuracy that is rarely attainable in fossil bivalves, especially of the older formations. The genus may be described in general terms as an *Astarte* with the addition of very strong lateral teeth. The shell is longitudinally oval, very thick, equivalve, inequilateral, perfectly closed; the hinge very strong; the right valve with two oblique converging cardinal teeth as in *Astarte*, but these teeth are flat, and only divided by a slight groove, which is sometimes obsolete. Below these teeth and immediately behind the lunule is a depression extending in front of the anterior lateral tooth, with a corresponding elevation in the left valve, in which the true cardinal teeth are almost wholly obsolete. Above the cardinal teeth in both valves is a deep narrow groove, evidently for the reception of an external ligament, as in

Astarte. In front of the hinge is a deep and distinct lunule. The lateral teeth are remote and very strong; the anterior one of the right valve obtusely conical, the posterior one of the left valve elongated, and both mutually entering deep pits in the opposite valves. Umbones approximate. Muscular impressions very deep, placed immediately below the lateral teeth, their surfaces smooth; the posterior impression round, the anterior one ovate. Above the latter in both valves is a small oval detached muscular impression placed on the hinder surface of the lateral tooth, for the insertion of the retractor muscle of the foot. Pallial impression entire, parallel to the margin, which is not crenated. External surface of the shell more or less irregularly imbricated by the lines of growth. The geographical distribution of this genus is as yet confined to Northern Europe; its geological range is from the base of the lias up to the inferior oolite.

Several species of this genus were described by Sowerby in his 'Mineral Conchology,' under the genus *Unio*. They differ however from the whole of the *Unionidæ* in many respects, especially in the want of the small accessory muscular impression *behind* the anterior one (which occurs in the *Unionidæ*, and to which a branch of the retractor muscle of the foot is attached), in the presence of the lunule, in the shell not being nacreous, and in the habitat having been marine, as is sufficiently proved by the other fossil animals whose remains invariably accompany these shells.

M. Goldfuss has been no more successful than Mr. Sowerby in detecting the true generic relations of these shells, having in his 'Petrefacten' referred different species of them to the genera *Unio*, *Cytherea* and *Lucina*, without detecting the essential characters which distinguish them from all these genera.

M. Agassiz was the first to combine the different species of this group into one genus, though he failed to perceive that they are much more closely allied to the *Veneridæ* than to the *Unionidæ*. To this genus he gave the name of *Cardinia* in a paper read to the Helvetic Society at their meeting at Basle in 1838, and in 1840 he published the characters of the genus in his translation of Sowerby's 'Mineral Conchology.' In 1840 Mr. J. E. Gray gave the name *Ginorga* to this genus in the 'Synopsis of the British Museum,' p. 154; but this mere name, destitute alike of etymology and of definition, can have no claim for adoption. In January 1841, M. de Christol defined a genus *Sinemuria* in the 'Bulletin de la Société Géologique de la France,' which from the characters assigned is evidently identical with the genus before us, though he errs in supposing the ligament to have been internal instead of external. Lastly, in March 1842 Mr. S. Stutchbury described this group in great detail in the 'Annals of Natural History,' and bestowed on it the name of *Pachyodon*, a name

which had been used four years before by M. von Meyer for a genus of Mammals.

It appears from this historical statement, that as M. Agassiz was the first to publish the characters of the genus, so his generic name *Cardinia* must supersede all later ones.

Some authors have been disposed to extend the geological range of this genus, by including in it those numerous species from the coal-measures which Sowerby and most other palæontologists have regarded as true *Unionidæ*. Whether Agassiz originally proposed this extension of the genus I am not aware, having never yet been able to meet with his translation of the 'Mineral Conchology,' in which the group is first defined; but in his last work on the subject, the 'Études critiques sur les Mollusques Fossiles,' he seems to regard *Cardinia* as exclusively confined to the lias and lower oolite. De Koninck however, in his 'Description des Animaux Fossiles du terrain houillier de la Belgique,' classes these coal-measure shells as *Cardiniæ*, and prefixes a definition of the genus which seems to be chiefly copied from De Christol's definition of *Sinemuria*, and we may therefore conclude that De Koninck had not been able to examine the *interior* of the fossils which he describes. He seems to have made a compromise between the real characters of *Cardinia* and the erroneous statement of De Christol as to the *internal* ligament; for he says that the shell had *two* ligaments, one *internal* and the other *external*, a statement which I believe to be wholly incorrect.

Capt. Thomas Brown also seems to regard the coal-measure fossils as generically identical with the lias ones, since he has described, under Mr. Stutchbury's name *Pachyodon*, no less than twenty-six species of shells from the coal-measures, which he has illustrated with very accurate figures in the 'Annals of Natural History' for Dec. 1843, and in his own 'Fossil Conchology of Great Britain,' plate 73.

There are however many reasons for regarding as doubtful the supposed affinity between the Unioniform shells of the coal-measures and the true *Cardiniæ* of the lias, although it must be admitted that there is much general resemblance in their external forms. In the *first* place, I believe no author has yet seen or described the *interior* of any of the coal-measure shells, and there is consequently no positive evidence whatever as to the structure of their hinges. *Secondly*, although the general characters of the muscular and pallial impressions, as exhibited by the casts in both these sets of species, are very similar, yet in the coal-measure shells the muscular impressions are much smaller and shallower than in those of the lias, and the lateral teeth, if present at all, are evidently much less developed. *Thirdly*, in conformity with this greater feebleness of the connecting muscles, we find that the

shells of the coal-measure fossils are much thinner and weaker than in those from the lias. *Fourthly*, the shells from the coal-measures rarely exhibit any trace of a lunule, and when present it is more diffused and indistinct than in the liassic species. *Lastly*, the *Cardiniæ* from the lias were wholly marine in their habits, while there are strong grounds for believing that the species from the coal-beds inhabited fresh, or at most brackish water. This is shown by the fact that these *Unio*-like shells are almost invariably found in the beds of shale accompanying the coal, and not in the really marine formations of the same age. Now whether we suppose the coal to have grown *in situ* like peat, or to have been washed by currents into certain localities (both which theories are no doubt true in certain cases), we cannot deny the coal to be a terrestrial production; and therefore when we find a particular family of mollusks constantly, and almost always exclusively, accompanying the beds of coal, we have a very strong presumption that these animals had a lacustrine or estuarine habitat.

It is true that in some cases, as in Coalbrook Dale, at Halifax, at Glasgow, and in Belgium, the coal-measures contain an admixture of these bivalves with various marine genera; but this does not necessarily prove them to be marine species, for they may either (as suggested by Mr. Prestwich in his memoir on Coalbrook Dale, 'Geol. Proceedings,' vol. ii. p. 405) have been washed down into an estuary and there become mixed with marine shells, or by a depression of the land the sea may have washed the marine shells into the marshes tenanted by these supposed freshwater species. And it is important to remark, that in the carboniferous limestone, a strictly marine formation immediately preceding, and in some cases alternating with the coal-measures, these peculiar bivalves rarely if ever occur.

For these reasons I think we ought to abstain from classing the shells of the coal-measures with the well-marked and clearly-defined genus *Cardinia* of the lias. I do not indeed mean to assert that the carboniferous group of shells really belong to the *Unionidæ*, where they were formerly classed, for they want the supplementary anterior muscular impression which distinguishes that family*; but I think they may be for the present regarded as a distinct family, probably lacustrine, and possibly allied to *Unionidæ*, but the precise characters of which, and especially the structure of the hinge, are as yet unascertained. Perhaps Dr. Carpenter, whose researches on the microscopic structure of shells have opened to us a new element for the determination of fossil

* Mr. G. B. Sowerby, in his 'Genera of Recent and Fossil Shells,' states that he could find *no difference* between the casts from the coal-measures and those which he made from the inside of recent *Unios*, but he had perhaps overlooked the supplementary muscle of the latter.

Mollusca, may be able to throw further light on the affinities of these ambiguous yet characteristic fossils.

Confining our attention therefore to the shells of the lias and lower oolite, we will proceed to examine the species of *Cardinia* which really exist in nature, as well as those which have been described in books.

I. *Ascertained species of* Cardinia.

1. Cardinia Listeri, *Sow.* (sp.)

Donax ? Park. Org. Rem. pl. 13. f. 7.
Unio Listeri, Sow. Min. Con. pl. 154. f. 1, 3, 4.
Pachyodon Listeri, Stutchb. in Ann. Nat. Hist. vol. viii. pl. 9. f. 1, 2.

Var. 1. Subelongate.

Cytherea latiplexa, Goldf. Petref. pl. 149. f. 6.
Unio hybrida, Sow. Min. Con. pl. 154. f. 2.
Pachyodon hybridus, Stutchb. in Ann. Nat. Hist. vol. viii. pl. 9. f. 3, 4.
Cardinia hybrida, Agass. Et. Crit. Moll. pl. 12.

Var. 2. Subcompressed.

Cytherea lamellosa, Goldf. Petref. pl. 149. f. 8.

Var. 3. Lines of growth very numerous.

Pachyodon imbricatus, Stutchb. in Ann. Nat. Hist. vol. viii. pl. 9. f. 5, 6.

Var. 4. Small-sized (probably young).

Pachyodon cuneatus, Stutchb. in Ann. Nat. Hist. vol. viii. pl. 10. f. 11, 12.

Var. 5.

Cardinia amygdala, Ag. Et. Crit. Moll. pl. 12. f. 10—12.

Formation : lower lias.

Localities : Whitby, Yorkshire ; Grantham ; Langar, Nottinghamshire ; Cropthorn, Defford and Eckington, Worcestershire ; Frethern, Gloucestershire ; Wurtemburg.

In Worcestershire and Gloucestershire this species is very abundant in a zone of the lower lias, about 150 feet above the base of that formation. Single valves are frequent. It is subject to much variation in the thickness of the shell, the frequency and regularity of the imbrications, and the length or shortness of the posterior extremity. Having examined a very extensive series of specimens, I have little doubt of the correctness of the above synonyms.

2. Cardinia crassissima, *Sow.* (sp.)

Unio crassissima, Sow. Min. Col. pl. 153.
Pachyodon crassissimus, Stutchb. in Ann. Nat. Hist. vol. viii. pl. 9. f. 7.

Lower oolite : Dundry ; Wick near Bath.
Marlstone : Dumbleton, Worcestershire.

3. Cardinia crassiuscula, *Sow.* (sp.)

Unio crassiusculus, Sow. Min. Con. pl. 185 ; Zieten, Verst. Wurt. pl. 60. f. 1.

Pachyodon crassiusculus, Stutchb. in Ann. Nat. Hist. vol. viii. pl. 9. f. 8.

Pullastra antiqua, Phill. Geol. Yorksh. pl. 13. f. 16.

Var. 1. Small-sized, perhaps young.

Cardinia elliptica, Ag. Et. Crit. Moll. pl. 12. f. 16, 17.

Var. 2.

Cardinia similis, Ag. Et. Crit. Moll. pl. 12. f. 23.

Formation : lias.

Localities : Pocklington and Robin Hood's Bay, Yorkshire; Nottinghamshire, Gloucestershire, Somersetshire.

Wurtemburg ; Stuttgard. Var. 1. Argovie ; var. 2. Soleure.

After a careful comparison of specimens, I have little doubt of the specific identity of the above references.

4. Cardinia lanceolata, *Stutchb.* (sp.)

Pachyodon lanceolatus, Stutchb. in Ann. Nat. Hist. vol. viii. p. 484.

Formation : lower lias.

Locality : Robin Hood's Bay, Yorkshire.

The figure intended for this species by M. Agassiz was taken from a specimen of *C. attenuata* which I sent him.

5. Cardinia attenuata, *Stutchb.* (sp.)

Pachyodon attenuatus, Stutchb. in Ann. Nat. Hist. vol. viii. pl. 10. f. 13, 14.

Cardinia lanceolata, Ag. Et. Crit. Moll. pl. 12″. f. 1—3.

Formation : top of lower lias, just below the marlstone.

Localities : Hewlets near Cheltenham ; Bourton-on-the-Water, Gloucestershire.

M. Agassiz's figure above-quoted is taken from a specimen which I sent him, and I am therefore satisfied that it belongs to the present species.

6. Cardinia concinna, *Sow.* (sp.)

Unio concinnus, Sow. Min. Con. pl. 223. f. 1, 2 ; Zieten, Verst. Wurt. pl. 60. f. 2 to 5 ; Goldf. Petref. pl. 132. f. 2 ; Bronn, Lethæa Geogn. p. 361.

Pachyodon concinnus, Stutchb. in Ann. Nat. Hist. vol. viii. pl. 10. f. 15, 16.

Cardinia concinna, Ag. Et. Crit. Moll. pl. 12. f. 21, 22.

Formations : marlstone and lias.

Localities : Yorkshire ; Langar, Nottinghamshire ; Daventry, Northamptonshire ; Saltford and Weston near Bath ; Wurtemberg, Fachsenfeld ; Mogglingen ; Staffelegg in Argau.

This is the largest species of the genus. I have a specimen

from the marlstone of Byfield in Northamptonshire which is $5\frac{1}{2}$ inches long by 3 inches broad.

7. Cardinia ovalis, *Stutchb.* (sp.)

Lucina lævis, Goldf. Petref. pl. 146. f. 11.

Pachyodon ovalis, Stutchb. in Ann. Nat. Hist. vol. viii. pl. 10. f. 17, 18, 19.

Cardinia unionides, Ag. Et. Crit. Moll. pl. 12″. f. 7—9.

Var. 1.

C. cyprina, Ag. Et. Crit. Moll. pl. 12″. f. 4—6.

Formation : lower lias.

Localities : Dunhamstead and Coltknap hill, Worcestershire ; Ashleworth and Frethern, Gloucestershire ; Watchet, Somersetshire ; Blumenroth, Coburg.

M. Goldfuss's specific name *lævis* is prior to the other two ; but as it is founded on an erroneous identification with the *Corbis lævis* of Sowerby, which is a very different shell, I retain Mr. Stutchbury's name *ovalis*. The two supposed species figured by M. Agassiz are both founded on specimens which I sent to that learned naturalist myself, and I am therefore able to identify them positively with the present species. In Worcestershire this fossil abounds about 100 feet above the base of the lower lias. Single valves are very rare.

8. Cardinia sulcata, *Ag.*

Cardinia sulcata, Ag. Et. Crit. Moll. pl. 12. f. 1—9.

Formation : " Calcaire à Gryphites."

Locality : Soleure.

Judging from the figure and description, the above seems to be a distinct species.

9. Cardinia aptychus, *Goldf.* (sp.)

Cytherea aptychus, Goldf. Petref. pl. 149. f. 7.

Formation : lias.

Locality : Amberg.

I have seen and examined specimens of all the above species except nos. 8 and 9.

II. *Species referable to this genus, but whose specific characters require further investigation.*

1. *Pachyodon abductus*, Stutchb. in Ann. Nat. Hist. vol. viii. pl. 9. f. 9, 10.

I think this is probably one of the numerous varieties of *C. Listeri*. I agree with M. Agassiz that it is not the *Unio abductus* of Phillips.

2. *Cardinia oblonga*, Ag. Et. Crit. Moll. pl. 12. f. 13—15.

From the lower oolite of Normandy. Described *from a cast*,

an authority on which it must be very unsafe to found *specific* distinctions.

3. *Cardinia lævis*, Ag. Et. Crit. Moll. pl. 12″. f. 13—15.

From Mulhausen. It is not the *Lucina lævis* of Goldfuss. Perhaps a variety of *C. Listeri* or *crassiuscula*.

4. *Cardinia securiformis*, Ag. Et. Crit. Moll. pl. 12″. f. 16—18.

From Soleure; described from a cast, and perhaps only a variety of *C. concinna*.

5. *Sinemuria Dufrenii*, De Christol, Bullet. Soc. Géol. de la France, Jan. 11, 1841.

From "fer oligiste" of Semur. It is impossible to say, from the brief description given, whether this shell be a distinct species or not.

6. *Unio depressus*, Zieten, Verst. Wurt. pl. 61. f. 1.

From Dejerloch near Stuttgard. Probably referable to variety 1. of *C. Listeri*.

III. *Species apparently referable to other genera.*

1. *Venulites trigonellaris*, Schloth. Petref. p. 198; *Cytherea trigonellaris*, Goldf. Petref. pl. 149. f. 5.

From the lias of Alsace; perhaps not a *Cardinia*.

2. *Unio abductus*, Phillips, Geol. of Yorksh. pl. 11. f. 42.

From inferior oolite of Glaizedale. Possibly a *Cardinia*, but M. Agassiz regards it as a *Gresslya*.

3. *Cardinia quadrata*, Ag. Et. Crit. Moll. pl. 12″. f. 10—12.

From lias of Lower Rhine. The above figure appears to represent an *Astarte*, and much resembles *A. lurida*, Sow.

4. *Unio Listeri*, Goldf. Petref. pl. 132. f. 1.

This seems to be the *Amphidesma donaciforme* or *rotundatum* of Phillips, and belongs to the genus *Gresslya*, Agassiz.

5. *Unio uniformis*, Sow. Min. Con. pl. 33. f. 4.

6. *Unio acuta*, Sow. Min. Con. pl. 33. f. 5, 6, 7.

The last two species, said by Sowerby to be from the middle oolite, are referred to *Cardinia* by Agassiz, in his translation of the 'Mineral Conchology.'

7. *Pachyodon hamatus*, Brown in Ann. Nat. Hist. vol. xi. pl. 16. f. 6.

From Oxford clay of Gristhorpe Bay, and certainly not a *Cardinia*.

8. *Pachyodon vetustus*, Brown in Ann. Nat. Hist. vol. xi. pl. 16. f. 7.

From shale at Gristhorpe Bay, and probably not a *Cardinia*.

9. *Unio striatus*, Goldf. Petref. pl. 132. f. 3.

From coral rag, Nattheim.

10. *Unio liasinus*, Zieten, Verst. Wurt. pl. 61. f. 2; Bronn, Lethæa Geogn. pl. 19. f. 17.

From Fildres near Stuttgard. This is evidently a *Gresslya*, allied to *Amphidesma rotundatum*, Phillips.

XV.—*On the Marine Algæ of the vicinity of Aberdeen.* By G. Dickie, M.D., Lecturer on Botany in the University and King's College of Aberdeen*.

[Continued from vol. xiii. p. 335.]

[With a Plate.]

Previous to entering on the remaining species of the olive-coloured Algæ found in this vicinity, it will be necessary to direct attention to the difference usually understood between the reproductive bodies called *spores* and *sporidia*.

The remarks already made on the *acrosperms* (*sporidia*) of *Fucus*, &c., and the accompanying figures, will sufficiently explain their structure; it must be observed, that up to the time of maturity they are enclosed in cells (*asci*), from which, when ripe, they are readily emitted. It is more than probable, however, that there are instances in which there is an intimate adhesion between the sporidia and their asci, so that both drop off together.

The observations recorded in the first part of this communication, on the development of the seeds of *Fucus serratus*, will explain the nature of *spores*; the latter are not necessarily enclosed in cells up to the time of maturity, but usually become free.

A difference exists in many Algæ between the appearance of the contents of the *spores* and *sporidia*: in the latter, the granular matter has a tendency to cohere in masses, which often assume a definite arrangement; the contents of the *spores* are more abundant, so much so that these bodies are generally dark-coloured and almost opake,—hence the expression *Melanospermeæ*, and the granular matter probably never (?) assumes a definite arrangement.

Sporochnoideæ.

Desmarestia ligulata, Lamour.—This species appears to be of rare occurrence, strictly confined to deep water, and only found cast up after storms. The first specimens were found by Dr. Andrew Fleming in October last, on the beach near Don mouth,

* Read before the Botanical Society of Edinburgh, 11th April 1844.

after a gale, and a few days subsequently I found some very large examples near the mouth of the Dee.

D. aculeata, Lamour.—Is very abundant, and, like the former, an inhabitant mostly of deep water; on one occasion only have I seen it *in situ* at low-water mark.

Owing to the localities in which these species grow, no opportunity has been afforded of procuring them at different seasons in states favourable for microscopic examination. The fructification has by some been supposed to be connected with the pencils of filaments which are plentifully produced. The structure of these filaments differs essentially from that of the simple or branched filaments which usually accompany the *spores* and *sporidia* in other Algæ; in *Desmarestia* they are generally flattened, being composed of several slices of cells on the same plane, and often appear like fronds in miniature. It is by no means improbable that they afford one way by which the plants are propagated. The very fact that these filaments (miniature fronds?) are so copiously produced, may be the very reason that neither true *spores* nor *sporidia* have hitherto been found. Among Phænogamous plants there are examples of what may be an analogous mode of reproduction, as in *Saxifraga foliolosa*, Br., of the Arctic regions, and others; in mosses, as *Macromitrium Leprieurii*, Montagne. The same is no doubt true of some Lichens, and why not also of Algæ?

Mr. Lyell has presented me with specimens of *D. aculeata* picked up on the beach of Cockburn Island, lat. 64° 12′ S.: in this desolate region the temperature may be unfavourable to the development of true fructification, and the viviparous (?) mode alluded to may be legitimately inferred.

From the structure of the frond in our two species of *Desmarestia*, I should be inclined to predict that the fructification, when detected, will be found to consist of *spores*.

Dictyoteæ.

Padina Pavonia, Lamour.—This beautiful plant is stated, in Dr. Greville's 'Algæ,' and in Sir W. J. Hooker's 'Flora,' to have been found at Aberdeen. The statement, I believe, was first made by Lightfoot, on the authority of Dr. Cargill; I have often searched for it, but in vain.

Dictyosiphon fœniculaceus, Grev.—It occurs in pools between high- and low-water mark, but nearer the former, in great profusion and of large size. It may be reckoned among the most common species. The fructification is stated, in 'Harvey's Manual,' to be rare; I have found it not unfrequently, but only on distorted specimens, not exceeding three or four inches in length.

Punctaria plantaginea, Grev.—Is not uncommon in summer in pools near high-water mark.

Asperococcus echinatus, Grev.—Not uncommon along with the former.

A. pusillus, Hook.—A plant corresponding to the description usually given, and resembling in structure authentic specimens sent me by Mr. Thompson of Belfast, occurs here, though rarely; it is usually parasitical on *Polysiphonia nigrescens*, but very small.

Chorda lomentaria, Grev.—Not unfrequent in pools near high-water mark.

C. filum, Lamour.—This species, so common on many parts of the British coast, and attaining so great a size as that mentioned in the 'Algæ Britannicæ,' is comparatively a rare plant in this vicinity, occurring only in deep pools at high-water mark, and seldom exceeding two feet in length. I have seen it in the small harbour of Stonehaven attached to stones imbedded in mud, and attaining a greater size than at Aberdeen. Dr. Greville describes the fructification as consisting of "external masses of pear-shaped seeds fixed by their base," and gives a figure of these; he however alludes to a second kind, composed of "sessile ovate capsules scattered among clavate articulated filaments," discovered by Captain Carmichael and figured in 'Flora Londinensis.' The bodies described and figured in the 'Algæ Britannicæ' constitute merely the cortical tissue of the plant; the true fruit, consisting of *asci* and *sporidia*, is imbedded in that tissue, and probably identical with the bodies seen by Carmichael and represented in the 'Flora Londinensis,' which I have no opportunity of consulting. I consider it unnecessary to give any representation of this true fructification, since it exactly resembles that of *Alaria* and *Laminaria* already figured.

Ectocarpeæ.

Cladostephus verticillatus, Lyngb., and *C. spongiosus*, Ag., are both not uncommon in pools within high-water mark.

Sphacelaria plumosa, Lyngb.—Is one of the rarest of our olive-coloured Algæ; only a few small plants, not exceeding an inch in height, have been found in pools within high-water mark.

S. cirrhosa, Ag.—At least two of the varieties of this species occur abundantly in pools.

S. olivacea, Ag.—Appears to be rather local; it occurs on perpendicular faces of rocks near low-water mark.

Ectocarpus littoralis, Lyngb.—Is very common on the coast, and found abundantly about the mouths of the Dee and Don; it passes more than a mile up the former river, and often grows luxuriantly in places where at low-tide it is freely exposed to a strong current of fresh water.

E. siliculosus, Lyngb.—Very common in pools near high-water mark.

E. Hincksiæ.—This species, of which, as stated in his 'Manual,' Mr. Harvey had only seen one specimen, is very abundant on the fronds of *Laminaria digitata*, and sometimes on *Rhodomenia palmata*, in the latter end of April and in May. It appears to be a very distinct species.

E. tomentosus, Lyngb.—Very common on different species of *Fucus* near low-water mark.

E. granulosus, Ag.—Parasitical on other Algæ in pools near high-water mark, but rare.

E. sphærophorus, Carm.—In June 1843 this species was found abundantly, parasitical on one of the most abundant of our *Rhodospermeæ*, viz. *Calithamnion spongiosum*. It bears fruit copiously, and never exceeds, in this vicinity, an inch in height, and usually is much less.

Myriotrichia filiformis.—Is not unfrequent in pools at high-water mark, attached to small specimens of *Chorda lomentaria*.

Chordarieæ.

Chordaria flagelliformis, Ag.—Is very abundant and generally distributed. The fructification, according to Turner, consists of "oblong or pyriform seeds lying among the concentrical filaments." I have not been able hitherto clearly to ascertain the true structure of the fructification in this species, but should, from analogy, infer it to consist of *spores*.

Helminthocladia virescens.—Is in some seasons very abundant on rocks about half way between high- and low-water marks, and straggling specimens occur in pools at the latter.

Corynephora marina, Ag.—This remarkable plant is plentiful in summer, attached to other Algæ and corallines. In Harvey's 'Manual' a passage is quoted from Carmichael in reference to its fructification, the term "sporidia" being made use of: it ought to be "spores."

In the first part of this communication it was stated that "the coast here is much exposed to the action of heavy seas, and presents few sheltered coves or even calm pools of any extent, and hence probably we may account for the absence of some of the more delicate species;" it must not, however, be inferred that this is the only reason why certain Algæ are entirely absent from our coast; the influence of temperature must be far greater. At least two other species may yet be expected to be found, viz. *Laminaria bulbosa* and *Dichloria viridis*; the former being of such general occurrence on the British coasts, and the latter having been seen in the Moray Frith.

Scarcely one-half of the Melanospermous Algæ enumerated in

Harvey's 'Manual' as occurring in Britain are found here; the proportions will be best seen from the following tabular view.

	Aberdeen.	Britain.
Fucoideæ	7	16
Lichineæ	1	2
Laminarieæ	3	7
Sporochnoideæ	2	7
Dictyoteæ	6	18
Ectocarpeæ	12	25
Chordarieæ	3	5
Total number of species	34	80

Among the *Fucoideæ* the total absence of *Cystoseira* will be observed, and scarcely one-half of the British species occur; of *Laminarieæ* scarcely one-half; of *Sporochnoideæ* only one-third, the two species of *Desmarestia* being generally distributed in Britain. There is also a great deficiency in the *Dictyoteæ, Cutleria, Halyseris, Padina, Dictyota* and *Striaria* being totally absent. Of *Ectocarpeæ* about one-half of the British species are found, and three out of five *Chordarieæ*.

It is proposed at an early opportunity to communicate observations similar to the present on the *Rhodospermeæ* of this coast.

The results obtained from careful dissections of the fructification of our *Melanospermeæ* have led to similar examinations of species from other parts of Britain, of which I possess and have only seen dried specimens. These may now be recorded, allowance being necessary for the disadvantageous circumstances under which the dissections have been made.

Dichloria viridis, Grev.—On this plant Dr. Greville states that he has seen no pencils of filaments. On a dried specimen received through the liberality of Mrs. Griffiths they certainly are present; it also appears to have nearly the same structure as *Desmarestia*, and not such as is represented in the 'Algæ Britannicæ'; drying and pressure have, however, probably produced some change. If pencils of filaments (miniature fronds?) are usually produced by it, the remarks already made in reference to *Desmarestia* will also be applicable here.

Sporochnus pedunculatus, Ag.—Described in Harvey's 'Manual' thus: "Fructification club-shaped moniliform filaments, radiating in scattered warts or concentrical in distinct (mostly clavate, stalked) receptacles, often terminated by a deciduous tuft of filaments." The clavate receptacles consist of a central tissue continuous with the short stem, and a cortical, composed of branched filaments placed perpendicularly to the former, and concrete. The pencils of filaments consist of the free ends of the central fibrous tissue. The cortical part (branched filaments) contains distinct *asci* and *sporidia*; these were very evident in a

fragment of an Irish specimen sent me by Mr. Thompson of Belfast. To observe this structure, it is best to employ pressure in a drop of sea-water; the *asci* and *sporidia* are very minute. See Plate II. figs. 1, 2, 3.

Sporochnus rhizodes, Ag.—Having only examined dried specimens of this species, it is with much diffidence that I venture to describe its fructification as differing essentially from that of the last, and consequently requiring to be removed from the same genus. Those who may have opportunities of examining fresh specimens in different stages can alone be entitled finally to decide this question.

The warts are composed of moniliform simple filaments, at the bases of which pear-shaped *spores* will be seen nestling. The resemblance to the fructification of *Asperococcus echinatus* (and probably also to that of *Chordaria flagelliformis*) is most striking. Figs. 4 & 5 represent the structure described.

Elaionema villosum, Berk.—The fructification of this plant was first pointed out by the Rev. M. J. Berkeley, and a figure given in the 'Gleanings of British Algæ.' The structure seen in dried specimens is represented at Pl. II. fig. 7, and differing somewhat from Mr. Berkeley's representation: in fig. 6 is shown the fructification at an early stage; the *asci*, enclosing several *sporidia*, are at that time distinct. I believe, that in a more advanced stage an adhesion takes place between the *asci* and enclosed *sporidia*, fig. 8.

The results above stated have prompted the following "Suggestions towards an Arrangement of the British *Melanospermeæ*."

1. Melanospermeæ.

Spores and sporidia on the same or on different plants, and in the same or in different conceptacles.

a. Heterospermeæ.
Cystoseira.
Halidrys.
Fucus.
Himanthalia.
b. Sporiferæ.
Halyseris.
Padina.
Dictyota.
Punctaria.
Striaria.
Asperococcus.
Dictyosiphon.

Sporochnus (rhizodes).
Chordaria.
Myriotrichia.
Helminthocladia.
Corynephora.

Cladostephus.
Lichina.
Sphacelaria.
Ectocarpus.
?
Desmarestia.
Dichloria.
c. Sporidiferæ.
Alaria.
Laminaria.
Cutleria.

Chorda.
Sporochnus (pedunculatus).
Elaionema.

From an examination of *Cystoseira* under very unfavourable circumstances, viz. of dried specimens, and the fruit probably immature, I am inclined to believe that spores and sporidia occur in the same conceptacles. There is some reason to believe that the same arrangement prevails in *Halidrys*.

In the *Sporiferæ* other subdivisions suggest themselves: in some the spores are erumpent, breaking out beneath the cuticle as in *Padina*; in others, as *Striaria*, the spores are unaccompanied by filaments, and *Asperoccocus* may be cited where the spores are so accompanied. Should *Desmarestia* and *Dichloria* be found sporiferous, they will be properly placed beside *Halyseris*.

In *Sporidiferæ*, as in *Sporiferæ*, there occur membranous and filamentous species.

A question may arise as to the relative importance of spores and sporidia; there cannot be a doubt that both are equally capable of propagating the species.

The above can only be considered an imperfect attempt, a mere outline or suggestion; those who possess a thorough knowledge of foreign as well as British species are alone entitled to speak with confidence on the subject, and to such knowledge the author of this attempt can lay no claim, and must leave his suggestions to be added to and amended by more experienced algologists.

XVI.—*Further Observations on the Ornithology of the neighbourhood of Calcutta.* By Edward Blyth, Curator to the Museum of the Asiatic Society of Bengal. *With Notes by* H. E. Strickland, M.A.

[Concluded from p. 48.]

No. 127. (vol. xii. p. 165, *supra*) I observed great numbers of *Hirundo rustica* a few weeks ago, skimming over the salt-water lake a little above Calcutta.

No. 127 *a*. *Hirundo daurica* (*erythropygia*, Sykes) was observed in considerable numbers in the middle of April upon the Calcutta esplanade.

No. 128. This is also the *M. dukhunensis* of Sykes. I observe that the *M. picata* of Franklin, which is the *M. variegata*, Latham, is mentioned as having been received from Calcutta in the 'Rev. Zool. par la Soc. Cuv.' 1839, pp. 40 and 138 (this being the only volume of the useful work in question which I have for reference); but I have never heard of the species being obtained in this neighbourhood, having only received it from Central and Southern India.

No. 130. This remarkable species, which is the type of my genus *Nemoricola*, is the *Bergeronette grise des Indes* of Sonnerat, upon which Latham founds his *Motacilla indica*. I obtained one beautiful specimen during last cold season.

No. 130 *a*, *b*. The genus *Budytes* was strangely omitted in my catalogue, though two species are common: *B. citreola*, which is less abundant, and of which I have one example with a jetty-black back, and *B. beema*, Sykes, which is extremely common, and approximates the *B. neglecta*, Gould. The sexes of this bird appear to assemble in separate flocks; at least I have two or three times vainly sought to pick out a female from among a flock of males, and I think that I have also observed a flock of females only. The note of this bird is much weaker and less articulate than that of *B. flava* of Britain. The young males assume yellow under-parts in February and March, and a dull leaden-blue cap and nape, having a strongly defined whitish supercilium; in old males the under-parts are much brighter yellow, and the head and nape are fine dark ashy-gray, with no trace of supercilium, the throat continuing white at all ages, spreading laterally to contrast with the dark ear-coverts. A black cap I have never seen, though Mr. Jerdon includes *B. melanocephala* among the species of Southern India, and doubts its distinctness from *B. beema*, which he identifies with *B. neglecta*. See also Mr. Drummond's remarks on the species of the Ionian Islands, vol. xii. p. 416 *ante*. Specimens with the supercilium slightly developed, or with only a trace of it, are also here common *.

Of *Anthi* I have an extensive series of Indian species, but have obtained no additional ones in this vicinity.

No. 134. This lark I heard singing delightfully, soaring over the dry rice-stubble along the banks of the river during a late excursion; its song and mode of delivery closely resembling that of the British skylark. No. 135 appears to be identical with *A. gulgula*, apud Jerdon, and I have not obtained a second example of it in this part. I have also a very extensive series of Indian larks and *Mirafræ* to describe, as soon as I can get leisure to do so.

No. 139 is also *Alauda gingica* of Latham, after Sonnerat.

No. 141. I observed a large flock of this species during my late excursion, feeding upon the seeds of the reeds, &c. which choke up the moat surrounding the old fort at Budge Budge, a most capital locale for the researches of the ornithologist.

No. 142. I have now obtained wild specimens of *Euplectes striatus*, which I had previously procured only in the bird-shops†.

No. 145. *Spermestes malacca*, auct.

No. 149. For a monographic notice of the species of *Phyllornis*,

* The species of *Budytes* are as yet by no means satisfactorily made out. It appears clear however that the gray-headed species of India and Malasia (*Motacilla bistrigata*, Raffles) is the same with the *cinereocapilla* of Southern Europe. The young of this in Europe has a *yellow* superciliary streak, and I have a similar specimen from India. It appears from Mr. Blyth's account that the Indian bird with a *white* supercilium (*B. beema*, Sykes) is also the young of the *bistrigata*; and if this be certainly the case, the true *B. flava* of North Europe (*B. neglecta*, Gould) must be distinct, as the gray-headed birds without a white supercilium are never found in the North of Europe.—H. E. S.

† *E. striatus*, Blyth, seems to be the *E. flaviceps*, Swainson, 'Animals in Menageries,' p. 310.—H. E. S.

v. *Chloropsis*, vide J. A. S. B. no. 59. p. 955 *et seq.* I cannot just now enlighten Mr. Strickland on the subject of the structure of these birds, further than by remarking that the species with a curved and pointed bill have also a meliphagous conformation of tongue, by means of which, when caged, they will sip at sweets, but they require to be fed on the usual diet given to insectivorous birds. Vide Tickell's list for a slight notice of their habits *.

No. 153. *Dicæum Tickelliæ* has a pale flesh-coloured bill with dusky tip. Vide J. A. S. B. no. 59. n. s. p. 983†.

Nos. 154 and 155. My *Vinago militaris* is the species so designated by Gould, having an ash-coloured belly, and which abounds in Bengal and Nepal. That of Southern India, *V.* (or *Treron*) *chlorigaster*, nobis, I have once only obtained in this part, and have received specimens of it from Mr. Jerdon and others. I cannot recognise, however, the difference of size and structure of bill mentioned by Mr. Strickland ‡, the only distinctions consisting in the green or yellowish-green belly of *Tr. chlorigaster*, the absence of this colour on the basal half of the tail, and there is also at most but a faint trace of the same hue upon the forehead. *Tr. bicinctus* of India generally, and also Arracan, differs from *Tr. vernans* of the Malay countries, in having the forehead to beyond the eyes, the throat and sides of the neck bright green, the occiput alone gray, and the pinkish lilac hue surmounting the orange-colour of the breast diminished in quantity, and not spreading to the sides of the neck, while in *Tr. vernans* it quite surrounds the neck; the tail also is broadly tipped with ash-colour, appearing as ashy-white beneath, this character serving at once to distinguish the females, while the female *Tr. aromaticus* may be known from that of *Tr. bicinctus* by its ash-coloured forehead.

The *Sphenocercus* (G. R. Gray) *cantillans*, nobis, J. A. S. B. xii. 166, is said to occur in the Soonderbuns, though I rather doubt it,

* Having lately procured specimens of *Phyllornis* in which the tongue is preserved, I am now satisfied that they belong to the *Tenuirostres* and not to the *Pycnonotinæ*.—H. E. S.

† There can now be no doubt that *Diceum Tickelliæ* is the *Certhia erythrorhyncha* of Latham, and the latter specific name should be adopted.—H. E. S.

‡ This was owing to my having (at p. 38, *supra*) assumed as the true *militaris* a Malayan bird which now appears to be distinct and undescribed. It is the largest species of *Treron* known, with the beak very strong and almost *Vulturine* in form. Total length 14 inches; beak to gape 1 inch 4 lines; height 5¾ lines; wing 7¾ inches; medial rectrices 5 inches, external 4¼. My specimens are wholly greenish-gray above, greater covers and quills slaty-black, the middle covers and tertials margined externally with bright yellow, four medial rectrices greenish-gray, the rest slate-coloured tinged with green, and broadly tipped with light gray. Below pale grayish-green, a large patch on the breast of dull orange. Lower tail-covers chocolate (in a younger specimen gray, tipped with buff); beak plumbeous, pale yellow towards the end; legs flesh-colour. This species may be called *Treron magnirostris*. The true *militaris* of Temminck and Gould, which is the *phœnicoptera* of Latham, inhabits Northern India, as shown by Mr. Blyth, and the *chlorigaster*, Blyth (which name is prior to mine of *Treron Jerdoni*), occurs in the South of India.—H. E. S.

as the group to which it belongs appears to be monticolous. The *Sph. oxyurus*, in addition to *Sph. sphenurus*, inhabits Bengal and Assam.

Respecting the *Columba risoria* group, I consider that I have three distinct species before me :—1. that so commonly kept in cages, both here and in Europe, and which I presume is the North African species, of a pale isabelline colour ; 2. the South African *Turtur vinaceus* ; and 3. that common throughout India, with bluish-gray wings and tail, and altogether more resembling no. 2, but having the general hue paler, the under-parts much paler, and no dusky tinge upon the rump ; its note or coo also differing from that of no. 1. I am not acquainted with the two varieties of size mentioned by Major Franklin, but the Bengal species measures $12\frac{3}{4}$ to 13 inches long, by $19\frac{1}{2}$ to 20 in. in alar extent ; wing from bend $6\frac{3}{8}$ to $6\frac{5}{8}$ in., and middle tail-feathers $5\frac{1}{8}$ to $5\frac{3}{8}$ in.*

No. 161. I am not satisfied that Mr. Strickland is correct in regarding the wild pigeons which I mentioned as being brought somewhat abundantly to the London markets as the young of *C. livia*. The bird I alluded to is well known to Mr. Bartlett, who could procure any number of specimens ; and it is remarkable that individuals with barred wings appear never to occur among them. It is not improbably the blue rockier pigeon noticed by Gilbert White.

No. 163. This is the *Perdix gularis* of Temminck, and *Chickore* of Bengal sportsmen, so termed from its call, which much resembles that of the red-legged *P. chukar* of the Himalaya. It abounds in all the heavy jungles eastward of the Ganges, extending northward to the Malda range of hills, if not beyond.

The *Francolinus* or *Perdix lunulatus* of Valenciennes is evidently identical with the Curria partridge of Hardwicke, termed *F. Hardwickii* by Gray, and recently *F. nivosus* in the 'Mag. de Zoologie.' It comes chiefly from the country westward of Agra, and Mr. Jerdon has also recently obtained it in the south ; but an experienced sportsman assures me that he doubts exceedingly the existence of this bird in Bengal, though I observe that a double-spurred partridge is mentioned to occur in the Monghyr district, which I must inquire about.

No. 166. *Coturnix coromandelica* is, I am told, very abundant during the rains, at which season it breeds.

No. 168. This I now consider must have been the young of *Coturnix chinensis*.

Nos. 169 and 170. Mr. Jerdon has now ascertained, for certain, that the *Hemipodius taigoor* of Sykes is the male of his *H. pugnax*, the latter only having the black stripe down the throat and breast, besides being larger. This corresponds with what I have also observed of its Bengal representative, which appears always to be somewhat smaller than that of Southern India, and decidedly less rufous :

* The pale turtle-dove kept in cages is a domestic variety unknown in a wild state. The North African bird is the same as the Indian ; it is the true *Turtur risorius*, Linn. (sp.), and differs from *T. vinaceus* of S. Africa in having the lower wing-covers light and the lower tail-covers dark, while in *T. vinaceus* they are the reverse.—H. E. S.

from Nepal I have received a third closely-allied species, the *H. atrogularis* of Eyton, but which will bear the prior name of *plumbipes*, Hodgson, published in 1837, and which abounds in the Tenasserim provinces, and also in the vicinity of Singapore. There are two other Bengal species, additional also to *Dussumieri*; one of them the *Turnix tanki* of Buchanan, which likewise inhabits Nepal, and the other undescribed, which Mr. Jerdon has also obtained in the south. I believe that he has yet another Indian species of this group, collected by Lord Arthur Hay.

No. 171 *a*. Add *Gallus bankiva*, brought to me fresh from the vicinity.

No. 173 *et seq*. Herons, Bitterns, &c. Add *Ardea nobilis*, nobis, and *Botaurus sinensis* (*Ardea sinensis*, Lath., and *A. lepida*, Horsf.); I have also obtained two other specimens of *Botaurus stellaris*, and likewise the *B. flavicollis* (*Ardea flavicollis*, Lath., and *A. nigra*, Vieillot).

The Indian white Egrets are difficult to understand. There are three sizes of them, of which the smallest is the common *A. garzetta*, which is very abundant. The *A. orientalis* of Hardwicke's published drawings may, I suspect, be safely referred to this species, although the beak is represented to be wholly black, and the toes are coloured much too orange instead of greenish yellow. This species always sheds its crest prior to dropping its dorsal plumes; and the colour of its toes, contrasting with its black tarsi, at once distinguishes it.

The large white Egrets have, at all ages, the bill sometimes orange-yellow, sometimes wholly black, and sometimes the basal part of the bill is yellow and its terminal part black, varying in proportions. In one fine adult before me, with a fully developed train, the bill is about half yellow and half black; in another there is a yellowish ring only near the base; and I have observed the same differences in birds of the first year. The yellow-billed specimens constitute the *A. flavirostris*, Wagler, and the black-billed are probably the *A. modesta*, Gray, though I have never seen the train elongated as in Hardwicke's figure*.

Of the third size, which is intermediate, I once had several dozens of the young brought me, all of which had yellow bills, slightly tipped with dusky-black; what few adults (with dorsal trains) I have seen had the bill wholly yellow, with one exception only, wherein the terminal two-thirds are black; and the *A. nigrirostris* of Hardwicke and Gray appears to represent a specimen with bill wholly black. In the Egrets of this size, the wings measure 11 or 11½ inches in length, bill to forehead 3 in., tarsi 4½ in., the claws straighter and more elongated than in the great Egrets. The yellow-billed specimens constitute the *A. putea*, Buch. Hamilton MS.

The members of this group are now putting forth their nuptial

* What are the measurements of these large Indian Egrets? and do all the varieties referred to present the same dimensions? The Egrets of Southern Europe are almost as puzzling as those of India, and we shall look with interest for any light which Mr. Blyth can throw upon them.—H. E. S.

dress, and I trust this season to come to some distinct understanding of the variations here noticed.

No. 188. I did not observe a single specimen of this 'Adjutant' during the last period of the sojourn of the common great species.

No. 189. A young male of the Bengal jabiru, moulting into the adult plumage, measured 4 ft. 5 inches in total length by $7\frac{1}{4}$ ft. in alar expanse; wing $23\frac{1}{2}$ in.; tail $8\frac{1}{2}$ in.; beak to forehead 13 in., and 2 in. deep at base; bare part of tibia 9 in.; tarsi 13 in.; middle toe and claw $4\frac{1}{2}$ in. Another male, in full plumage, but retaining a few scattered nestling feathers, showing its age to be about the same as that of the last, corresponds exactly in its dimensions. An old female is smaller, especially its legs, the bare part of the tibia measuring but $7\frac{1}{2}$ inches; tarsi scarcely $11\frac{1}{2}$ in., and middle toe and claw 4 in.; bill to forehead $12\frac{1}{2}$ in., and closed wing 22 in. Bill black; irides of young dark, and legs dark brownish-lake; but the latter appear, in the adults, to have been coral-red (referring however to Mr. Jerdon's catalogue, I perceive that he assigns "rosy-red" as the colour of the legs of this species). The mouth, anterior scapularies, smaller wing-coverts, primaries and secondaries, and the entire under-parts, are white: head and neck brilliant steel-black, with green reflections; the crown reddish-purple, margined with brownish-green, and surrounded by steel-purple: posterior scapularies, tertiaries, the two greater ranges of wing-coverts, and the tail, bright green-black, varied with steel-blue. The young have the neck and upper parts brown, a little green-glossed, and indications of white upon the smaller wing-coverts. This bird is easily tamed, and if brought up from the nest may be suffered to range at large with impunity; but it is apt to attack strangers, its beak constituting a most formidable thrusting weapon*.

No. 196 is perfectly identical with the European species, of which I have received a specimen from England, and have obtained two others in this neighbourhood, besides several from various parts of India.

No. 198 *a*. I have obtained one specimen of a lapwing, closely resembling the *Vanellus leucurus* (Licht.) figured by Savigny, and which is stated in Griffith's work also to inhabit Tartary; but it has not the rufous-isabelline hue of the Egyptian bird, according to the figure alluded to, nor the defined ash-coloured patch on the breast: being chiefly of a grayish-brown, glossed with purplish-red upon the back, the breast inclining to cinereous, throat white, and belly dull rosy-white or somewhat deeply blushed; tail pure white; primaries black, and the greater wing-coverts broadly tipped with white, the next range more narrowly so; bill black, and legs bright yellow; no trace of crest, wattles, or of spurs on the wing; the irides reddish-amber. Length (of a female) 11 inches by 23 in. in spread of wing, the closed wing $6\frac{3}{4}$ in.; bill $1\frac{1}{8}$ in., and tarsi $2\frac{5}{8}$ in.

* It appears from the above description that the Indian *Mycteria* is the same with the *M. australis* from Australia. It cannot I think be referred to the *M. asiatica*, Lath., as I before conjectured, and we have yet to learn what bird is indicated by the latter name.—H. E. S.

Of the *Lobivanellus cinereus*, nobis, I procured many examples during the late cold season.

Nos. 201 and 202 I presume to be *Ch. Geoffroyi* and *Ch. Leschenaultii*.

No. 204. Also several specimens of *Charadrius Cantianus*.

No. 206. This is called *Himantopus asiaticus* by M. Lesson, in the erroneous supposition that the bird has never a black cap, as in the European species.

No. 209 is *Totanus stagnatilis*, Bechstein; also *T. tenuirostris*, Horsfield, and figured by two or three names in Hardwicke's published drawings. Respecting the greenshank, no. 208, I certainly was never satisfied of the alleged distinctness of the so-called *glottoides*, of which I have seen many specimens from the Himalaya, all of which were decidedly *T. glottis*, as Mr. Strickland suggests.

No. 212 is the European wood-sandpiper, commonly measuring $8\frac{3}{4}$ by 16 inches; wing 5 or $5\frac{1}{8}$ in. Dr. Horsfield's *T. affinis* is probably a stretched skin of the same*. Judging from the few specimens brought to the bazar, I was greatly astray in asserting *T. ochropus* and *T. hypoleucos* to be somewhat rare. The latter is excessively abundant a little way down the river, along its banks, on those of the *nullahol* (natural or artificial canals) communicating with it, and about the *jheels* or marshy lakes; the latter being also favourite haunts of *T. ochropus*.

No. 216 *et seq.* *Terekia javanica* was rather plentiful at the commencement of last cold season; *Tringa platyrhyncha* less numerous than during the preceding season; *Tr. Temminckii* common; *Tr. alpina* obtained once only, a single specimen. I have mentioned that *Tr. canutus* has been once obtained by Mr. Jerdon, who has also procured a single example of *Calidris arenaria*. Towards the mouth of the river, *Strepsilas interpres* occurs, and probably also *Hæmatopus longirostris*, which, with *Numenius phæopus*, I have received from both sides of the bay. The *Eurhinorhynchus orientalis*, nobis, has never yet occurred to me. I have procured one fine fresh specimen of a common woodcock, which species is probably not so rare as its haunts are inaccessible; and as regards the snipe referred to *gallinago*, it appears always to have fourteen rectrices†. Hardwicke's figure of *Scolopax Horsfieldi*, Gray, has certainly not much the appearance of *Sc. stenura*, but I doubt its being a peculiar species.

No. 231. I shall describe the Indian *Porphyrio*, which I cannot exactly satisfy myself is Dr. Horsfield's Javanese species, and also another undetermined *Porphyrio* in the museum. The former measures 17 or 18 inches by 30 to 33 in.; wing $8\frac{3}{4}$ to $9\frac{1}{2}$ in.; tail 4 in.; bill to gape $1\frac{1}{2}$ in.; tarsi $3\frac{1}{2}$ to $3\frac{3}{4}$ in.; middle toe and claw averaging $4\frac{1}{2}$ in.; frontal shield large and broad, extending beyond the eyes,

* I have lately examined the original specimen of Dr. Horsfield's *T. affinis*, which is certainly the *glareola*. It measures about 8 inches in length, the published measurement of 10 inches having been an error.—H. E. S.

† Be it remembered that the number of tail-feathers is subject to variation in the British wild swans, a fact I have observed both in *Cygnus musicus* and *C. Bewickii*.

and squared posteriorly. General colour purple, the fore-neck and breast verditer, and wings the same inclining to greenish; crown somewhat dusky, the sides of the face and immediately around the frontal shield dull white; lower tail-coverts pure white; the medial portion of the belly dusky-slate; irides bright red-brown; bill and frontal disc dark coral-red; and legs and toes reddish carneous, with dusky lead-coloured joints *.

The other species is probably either from the Moluccas or from China. Its size is rather superior to that of the Indian one, the bill larger and more robust, but the frontal shield smaller, rounded posteriorly, and not reaching beyond the eyes. In colour it is distinguished by having the back and scapularies green, the wings purple, the sides of the face dark, passing into verditer, and the crown, occiput and hind-neck dusky-purplish; all the purple of this species being darker and less vivid than that of the other. If undescribed, I propose to term it *P. dorsalis* †.

No. 232. *Gallinula parvifrons*, nobis. Distinguished from the European species by its inferior size and much less developed frontal shield; in other respects quite similar, as are also its habits and note. This bird is the *G. akool* of Mr. Jerdon's list; but I have also obtained the true *Porzana akool* (*Rallus akool* of Sykes) in this neighbourhood, a species having dark under tail-coverts, and the legs dark reddish-brown.

Nos. 234 and 235. These are identical; the *Rallus rufescens*, Jerdon, referring to the young female *Gal. lugubris*, Horsfield, vel *G. plumbea*, Vieillot, of which I have obtained several examples ‡.

Nos. 239 and 240. Both of these are common.

No. 241. The only flamingo which I have myself obtained here is *Phœnicopterus minor*, but there is a Calcutta specimen of *Ph. antiquorum*, Tem., in the museum, and I have received others from the upper provinces, &c.

Of Ducks, the only additional species to be mentioned is the *Anas formosa*, Gmelin, of which I procured a splendid male, shot on the salt-water lake §. Length 16½ by 27 inches. Bill black; feet dingy yellowish-olive, darker on the webs; irides dark; the tracheal osseous vesicle small. *Anas boschas* has not yet occurred, though Mr.

* It is evident from the above description that the Indian *Porphyrio* is not the *smaragnotus*, in which the back is of a pure olive-green. Neither can it, I think, be the *indicus* of Dr. Horsfield (*smaragdinus*, Temm.), which is only 15 (not 19) inches long, and in which the back is described as nearly black with a greenish tinge. The Indian bird appears from the description to approach most nearly to the European *P. antiquorum*, Edwards, pl. 87, in which however the frontal shield is said to be rounded. Mr. Blyth's second species seems to be the *smaragnotus* of Temminck, in which case the specimen was probably brought from S. Africa.—H. E. S.

† This approaches the *P. erythropus* of Stephens, which that author identifies with *P. smaragnotus*, Tem.

‡ Dr. Horsfield's *Gallinula gularis* is also the young of his *lugubris*.—H. E. S.

§ This is a widely different species from the 'bimaculated duck' of English authors.

Hodgson has met with it in Nepal, where, however, I have reason to suspect that it is very rare. On the Indus it appears to be tolerably common. This bird is represented in India generally and in the Burmese countries by *A. pœcilorhyncha*, which in many parts is extremely common, and here is more so than I formerly supposed.

No. 262. This is the true *Podiceps minor*, though referred to *P. phillipensis* by Mr. Jerdon. *P. cristatus* is also found in the upper provinces.

Nos. 265 and 266. Both of these pelicans are common in suitable localities, and they both vary exceedingly in size, as much so as *Numenius arquata* and *Limosa melanura*. I suspect that the females are always much smaller, but cannot pronounce upon this subject at present, as I find that I omitted to add the sex, when subsequently ascertained, to my notes on a number of recent specimens. Two examples of *P. onocrotalus* measured respectively 5½ ft. by 8 ft. 10 in.; wing 26; tail 8; bill to forehead 14½ in., and tarsi 5½ in.; and 4 ft. 8 in. by 7 ft. 10 in., 23, 7, 11 and 5. Another stuffed specimen, which appears conspicuously larger than the first of these, has the bill 15½ in., and wing 27 in. The small one has the supplementary glistening reddish-brown feathers on the breast, analogous to the supplementary feathers of the cormorants when in breeding costume. Of the other species, which I term *rufescens* with considerable doubt, an adult female measured 4½ ft. by 7¼ ft.; wing 21 in.; tail 7 in.; bill to forehead 12¼ in.: a young female is still smaller, and a young male much larger, the bill measuring 14½ in., and the wing 23½ in. This species has a row of dark spots along each lateral half of its upper mandible, more or less developed; the pouch also is commonly more or less spotted, sometimes very thickly so: the feathers of the head and neck are very different from those of *P. onocrotalus*, being larger, of lax and disunited texture and inclining upwards, as does also the occipital crest; irides pearly-white in the adult, those of the other being bright brownish-red. Colour of the adult white, slightly blushed, and more conspicuously tinged with yellow, especially also the wings, which have lengthened slender hackles impending their coverts of a strongly marked yellowish cast; back and rump dull brownish-rosy; head and neck tinged with ashy, from the bases of the feathers appearing externally; and breast also covered with dingy-yellowish or yellowish-brown hackles: pouch ashy; and legs leaden-black, slightly tinged with greenish; the claws white. The young have the upper parts brown, the feathers edged paler. I have sent specimens to the museum of the India-house.

Nos. 270 and 271. These must both be referred to *Gelochelidon* of Brehm. Both are numerous; the former being nos. 400 and 403 of Mr. Jerdon's list, and the latter nos. 398 and 404 of the same. Add *Anoüs tenuirostris* and *Rhynchops flavirostris*.

No. 274. Of this I have since procured a second specimen.

On casting my eye over the original list, bearing in mind all the additions and corrections which have been here noticed, I find that I have obtained about 293 species of birds in this immediate neighbourhood during a sojourn of two years and a half; and not count-

ing nos. 1, 4, 26, 45, 65, 67, 73, 82, 94, 117, 143, 149, 163, 171, 195 and 272, several of which might however be safely added. Mr. Jerdon's original list of the peninsular species generally (of the hills as well as of the plains) numbered 407 species; but of these several are merely nominal, though he has since added very considerably to that number. If I had included all which I know to inhabit Bengal, my list would have been much more extensive; but I have confined myself exclusively to the species which I have procured within a few miles of Calcutta: and so far are even these from being yet exhausted, that I have obtained no less than three additional *Raptores* while writing out the present paper, namely *Pernis maculosa*, Lesson (for certain), *Circaëtus gallicus* and a small *Accipiter*, which is probably the *Khandesra* hawk long sought for by Mr. Jerdon. With respect to my own opportunities for out-door observation, I may here repeat that they have been hitherto extremely few, for during the whole of the past year I was only one day absent from the museum; but I have now just returned from a week's excursion in the direction of the Soonderbuns, and have no intention of remaining quite so much at home for the future. Even in that short trip I found species of fish to be quite plentiful, which I had never, or but very rarely, seen in the bazar; among them a splendid undescribed *Sciæna*, taken in abundance in the middle of the stream, which I had only once or twice previously met with: and so far as birds are concerned, the extreme plentifulness of *Totanus hypoleucos*, and also the commonness of *T. ochropus* I was previously unaware of; having formed a judgement from the few brought by the bazar shikarees in comparison to the multitudes which they bring of *T. glareola* and some others.

Postscript.—Since the above was in type, a letter has been received from Mr. Blyth, dated Calcutta, May 9, 1844, of which the following are extracts:—

I avail myself of a steamer's departure direct from this to Suez, to forward another communication to you on zoological matters. The season is now over for collecting many things, but still I continue to pick up a little, and have received some valuable contributions from Arracan, &c. since I last wrote. I have also just received a very interesting letter from Jerdon, announcing a valuable collection on its way to me, containing various novelties from Southern India, and I likewise expect two other collections from the peninsula shortly. In this neighbourhood I have just obtained another *Cuculus canorus*, also *Phœnicophaust ristis* (Less. the *longicaudatus* of my first monograph on *Cuculidæ*), and one specimen of an *Iöra*, which proves, after all, that *typhia* and *zeylonica* are one and the same. This bird had about half acquired the black cap and back of *zeylonica*, the change of colour taking place in the feathers themselves without a moult. Yet it is strange, that of the great number of these birds which I have obtained both before and since, I have never procured another specimen with any trace of this *zeylonica* plumage. Add *Rhipidura albofrontata* to the number of birds not found in this vicinity, but which occur on the eastern side of the mountains of Central India,

extending to the Monghyr and Rajmahl hills. In my last letter I stated that the "Misham Yak," so called, was merely a S. African Gnoo, the frontlet of which had found its way to that distant locale; but a friend who has travelled in the Misham mountains, N.E. Assam, assures me that he saw there two or three similar frontlets, and I have just seen a female head of this "Assam Gnoo," shot by the late Lieut. Seppings of the Bengal Artillery to the northward of Bishnath, one of our frontier stations towards Bootan; this settles the question of the animal being Asiatic, and I shall now have the male and female frontlets figured without further delay. Is it not an extraordinary discovery to get a Gnoo in this part of the world?—perhaps more so even than that of the Shan Bison. [Ann. Nat. Hist. vol. xiii. p. 312.] It will not, however, inhabit the Misham mountains, which are densely covered with jungle, but the elevated plain beyond them. I shall come out very strong shortly, with a long list of new mammalia; and there seems no end to the number of new birds which I have now by me to describe. Among a variety of interesting specimens in spirits, chiefly of reptiles and fishes, and comprising no less than three new *Varani* among the former, are various bats, comprising the genus *Rhinopoma* from Agra and Mirzapore. I had previously been quite convinced, from the descriptions of people, that a bat of this genus was abundant in the Taj at Agra. Phayre has now sent me, chiefly from the vicinity of Sandowa, Arracan, as many as 139 species of birds, and several capital Mammalia. In the collection just arrived from him are two new monkeys, which are doubtless, and one of them certainly, the two *Cercopitheci* mentioned by Helfer. One is a small *Macacus*, most allied to *M. cynomolgus*, and with a similar long tail; this I shall call *M. cancrivorus*, from its habit of feeding principally on crustacea. The other is a tremendously muscular fellow, closely allied to the pigtailed *Macacus* of Java (*nemestrinus*), and to the *arctoides* of Is. Geoffroy: it has a copious mane on its fore-quarters, from which I shall style it *M. leoninus*. I have also from the same quarter a new *Paradoxurus*, some new *Sciuridæ*, and more specimens of the new *Manis*, some of which I shall soon forward to Dr. Horsfield. Among the birds is a magnificent *Lyncornis*, Gould, which if new may be called *L. splendidus*. Length about 15 inches; of wing $11\frac{1}{4}$, and tail $8\frac{1}{2}$ in.; the latter very broad, and the markings of it are superb, having alternate mottled ashy and mottled fulvous bands set off with black; there are no rictal vibrissæ, the feet are as in *Caprimulgus*, the wings firm and of considerable length, and the aigrette-like feathers on the sides of the head are, I know, as in Gould's genus. Do the other characters I have named also accord? The colour is difficult to describe without going much into detail; but the throat and breast are principally black, the shoulders of the wings bright bay, the head and tertiaries minutely mottled, with no large spots except along the middle of the crown. Does this brief description tally with either of Gould's species? Phayre has also sent a new genus resembling *Pomatorhinus* in all but the beak, which is straight and much less compressed, also not so much elongated: this I shall name *Orthorhinus*. Likewise

several new Bulbuls; and of *Nectariniidæ*, *Arachnothera inornata*, *Nect. goolpariensis*, *Phayrei* (vel *Hasseltii* ?), *mahrattensis*, *jugularis*, *lepida* (v. *javanica*), and *phœnicotis*, *Diceum cruentatum*, *cantillans*, and *chrysochlorum*, nobis, &c. &c. A shikaree in my employ has just come in with three specimens of *Phœnicophaus tristis*, a live young *Nisaëtus caligatus*, &c.

XVII.—*Remarks on the genus* Eolidina *of M. de Quatrefages.*

By Joshua Alder and Albany Hancock, Esqrs.

In a former communication on the Nudibranchiate Mollusca, we took occasion to express an opinion that the genus *Eolidina* of M. de Quatrefages was not a good one, the species on which it was founded being, in our opinion, nothing more than an *Eolis* imperfectly observed. It was irrelevant to the object of our former paper to enter into detail on the reasons which induced us to form such an opinion, but as its accuracy is doubted by M. de Quatrefages, we shall now take the liberty of stating more fully our objections to his genus, in order that the facts connected with it may be more thoroughly investigated. It is not our wish to enter into personal controversy, but the validity of a genus is a matter of sufficient importance in zoology to justify our remarks, more especially as there are some anomalous facts in comparative anatomy connected with it.

On a careful examination of the description and figure which M. de Quatrefages has given of his new genus, we must again assert, that we can find no external character to distinguish it from *Eolis*. With reference to this he remarks, "that *Eolidina* wants the *lateral* or *labial tentacles*, and that all zoologists at present consider the presence or absence of these appendages as furnishing true generic characters." We must confess our inability exactly to understand what is here meant by "lateral or labial tentacles." Cuvier, in establishing the genus *Eolis*, described it to have *four to six* tentacles; but subsequent observations have proved that the third pair of tentacles of Cuvier are nothing more than prolongations of the sides of the foot, varying in length in each species and frequently entirely wanting. Later zoologists have therefore, we think very properly, considered *Eolis* to have no more than four tentacles, two dorsal, and two oral or labial. Now the species on which the genus *Eolidina* is founded has just this number of tentacles placed in the usual manner; it has also the anterior angles of the foot slightly produced, exactly as they appear in several species of *Eolis*; indeed so nearly does it approach to some of the English species, that doubts might be raised of its specific distinctness. If then *Eolidina* is a distinct genus, it must depend upon anatomical characters alone. We are

well aware that it would be wrong to infer, in every case, the correspondence of internal characters from a similarity of outward form; but at the same time, when the external characters are so very similar as they are in the present instance, we should be led to expect, that if any difference in the anatomy did exist, it would not be such as to affect the most important animal functions. The two remarkable deviations from the typical organization of the family which M. de Quatrefages points out, are however of this kind. We consider ourselves justified, therefore, in scrutinizing more narrowly the accuracy of his observations. He complains that in asserting that the anus in *Eolis* is placed in the side, we do not enter into the details which are necessary to understand the relations of this orifice and the intestine proceeding from it with the gastro-vascular system.

This relationship is very simple. Our observations lead us to the conclusion, that the whole of the food which enters into the stomach does not pass into the gastro-vascular apparatus; indeed very little of the solid aliment enters it, and such as does is always driven back to the stomach, nothing being allowed to remain in this complicated system of vessels but the most refined portion of the products of digestion; such, in fact, as are capable of being converted into nutrition; and the mass of the grosser particles is conveyed by a short intestinal canal, crossing diagonally from the left to the right side of the body where the anus is situated. It is placed a short way behind, and generally a little above the orifice of generation: this we have ascertained beyond a doubt. It is difficult to see the anus when in a state of repose; but when the intestine is filled with coloured matter, or during the expulsion of the excrement, it may be very readily observed. In the latter case it is considerably enlarged and protruded into a nipple-shape. Let us now turn to M. de Quatrefages' description of these parts in *Eolidina*. According to his views, the anus is situated posteriorly at the termination of the central vessel of the gastro-vascular system, and connected with it: this central vessel he considers the intestinal canal. It is evident however, that as very little of the solid portions of the nutriment is admitted into those vessels, and as never any of it is allowed to remain there, the anus so placed is not available for the expulsion of the grosser excrementitious matter, and cannot in fact be considered a true anus; indeed M. de Quatrefages himself does not seem to consider it so. If therefore this aperture (which we have not detected in *Eolis*) does exist, it can only be considered as an excretory orifice, somewhat similar to those that we have found at the ends of the papillæ*.

* Since the publication of our last paper, we have had the opportunity of confirming our observations on the ejection of small bodies from the ends of

How then does M. de Quatrefages consider that the excrement is disposed of in *Eolidina*? If we understand him rightly, he has recourse to the idea that it is voided again by the mouth, as in some of the Radiata and Zoophytes. Is not such a supposition contrary to all analogy in an animal so highly organized as this mollusk? And is it not, we would ask, much more probable that M. de Quatrefages has overlooked the true intestine and anus, which, from the minuteness of the subject and the delicacy of its tissues, are difficult to detect, than that such an anomaly in organization should exist? That we admit the possibility of a posterior dorsal anus in this family will be seen in our description of *Proctonotus*, in which such an arrangement is found; and we have since been favoured by a friend with the examination of an undescribed animal of this family belonging to a new genus which has a similar post-dorsal vent; but in both instances, this part, which is prominent and tubular, we believe to be a true anus, connected with the intestine, and not an appendage to the gastro-vascular system. In the animal observed by M. Milne Edwards it is probably the same.

The other point of anatomy which we dispute is the absence of a male intromittent organ in the generative apparatus, and the consequent androgenous mode of reproduction, widely different from that of the family to which it belongs. Here again we think that M. de Quatrefages has overlooked the part in question. We observe that he has also failed to discover this organ in his genus *Zephyrina*, and considers that circumstance a proof of the correctness of his observation in *Eolidina*. In another place he expresses an opinion that his *Zephyrina* is the same as our *Venilia* (*Proctonotus*), in which we are inclined to agree, though, from the vagueness of his description of the former, we are unable to say so with certainty*.

the papillæ as there described. The contents of the ovate vesicle at the extremity of the papillæ are in most cases distinctly visible, and its action during the expulsion of the minute bodies is not at all obscure. When this takes place the sides of the vesicle are drawn towards each other, and the extremity, becoming tubular, is thrust into the very tip of the papilla where the orifice is placed. This action is generally repeated several times; each effort forcing the contents nearer the orifice, through which masses of small elliptical bodies are ejected at intervals with considerable violence, and occasionally to some distance. This certainly is very unlike disaggregation or diffluence from pressure, by which M. de Quatrefages supposes we may have been deceived. We used however during these examinations so little pressure that the papillæ could move freely about, and in one instance the animal crawled from one side of the compressor to the other while we were examining it.

* In the generic character of *Zephyrina*, as given by M. de Quatrefages, there is nothing to distinguish it from *Eolis*, excepting that it has respira-

Allowing their identity, we can assure him that *Proctonotus* has an intromittent organ similar to that of *Eolis*, as we have had the opportunity of seeing it exserted, and have a drawing of it in that state. The argument therefore turns on the other side; for if M. de Quatrefages has failed to detect it in one animal where it does exist, may he not also have done so in the other? These are our principal reasons for doubting the existence of the genus *Eolidina*. We would, however, urge upon M. de Quatrefages the desirableness of again procuring the animal for further examination*.

M. de Quatrefages has detached *Eolis* and the allied genera from the Nudibranchiata in order to unite them with *Acteon* and some other animals low in the scale of organization, and which seem to form a link between the Mollusca and *Planariæ*†. We suspect that that gentleman, having prematurely determined on this apparently incongruous union, has been hurried too rapidly

tory appendages on the head, "but forming only one row on each side of the head."

The number of rows of papillæ, however, can only be considered as affording a specific character in this family, and several of the *Eolides* have the papillæ extending in front as far as the sides of the dorsal tentacula. We mention this, not from any doubt that this animal is really distinct from *Eolis*, but as an example of the deficiency of the characters given as generic. We afterwards learn that the respiratory appendages are continued *round* the head; which, with the character of those appendages and other minor points of resemblance, induce us to believe that *Zephyrina* and *Proctonotus* are the same, though the latter has two rows of appendages on the sides and round the head, which, according to M. de Quatrefages' views of generic characters, would make them distinct. Our observations on the internal anatomy, however, are much more at variance. In the gastro-vascular system, our animal had not the longitudinal vessels down the sides of the body, as represented by that gentleman; yet as all the vessels of that system were coloured in our species, we could not have overlooked them.

* There are some other points of the anatomy of *Eolidina* which require further elucidation: for instance, the stomach, according to the figure, is placed remarkably far forward in the system; nearly in the position, before the dorsal tentacles, which we find the mouth to occupy in *Eolis*. M. de Quatrefages says that he is confirmed in the opinion of its being the stomach, by having seen in this mass of an analogous animal *the back-bone of a small fish*. More recently, in his description of *Acteon elegans*, when speaking of its tongue, which closely resembles that curious organ in *Eolis*, he says, that at first sight he mistook it for *the back-bone of a small fish*. Coupling these observations together, are there not grounds for supposing that M. de Quatrefages has really mistaken the buccal mass for the stomach? If so, the diagram representing its connexion with the gastro-vascular system cannot be correct. That *Eolidina* has a tongue similar to the rest of the family we cannot for a moment doubt, and this, as well as the corneous jaws, will most likely be detected on a re-examination.

† Of the new genera described, *Acteonia* is the *Limapontia* of Johnston (Loudon's Mag. Nat. Hist. vol. ix. p. 79), and *Amphorina* appears not to differ from *Eolis*, except in the gastro-vascular system.

to his conclusions; and perhaps has been too much inclined to form a low estimate of the characters of the *Eolidina**, thus making them correspond more nearly with their new allies. Some of the statements that we have now attempted to controvert are of this nature; and M. de Quatrefages is also inclined to disallow the existence of a heart and blood-vessels in *Zephyrina*, in which we suspect he is equally mistaken.

BIBLIOGRAPHICAL NOTICES.

Annales des Sciences Naturelles.

February 1844.—*Zoology*.—Considerations on some principles relating to the natural classification of animals, and especially on the methodical arrangement of the Mammalia, by M. Milne Edwards. A very important and highly philosophical essay, embodying the distinguished author's ideas on zoological classification, the publication of which has been suggested by the paper of Mr. Waterhouse in the 79th Number of the 'Annals of Natural History.'—On some fossil Fish-teeth found in the neighbourhood of Staoulli, in the province of Algeria, by M. Valenciennes. The formation in which these teeth were found is tertiary (miocene ?) : they belong to three species of *Sargus*, a *Chrysophrys* and an *Oxyrhina*, and are all extinct forms.—On the *Trypanosoma sanguinis*, a new species of *Hæmatozoon*, by M. Gruby†. This supposed animal (on the *individual* nature of which a doubt is thrown by M. Milne Edwards) was found circulating in the blood of frogs in spring and summer. Its body is long, flattened, transparent and twisted. The cephalic extremity is terminated by slender elongated filaments, and its caudal end terminates also in pointed filaments. It moves rapidly in a screw-like fashion.—A translation of Mr. Harry Goodsir's important paper on the Reproduction of Cirripeda.—A translation of an abstract of Dr. Carpenter's paper on the Microscopic Structure of Shells.—Researches on Osteogenesis, by Dr. Lebert.

Botany.—Continuation of the monograph of the *Nidulariæ*, by MM. L. and C. Tulasne (with admirable plates).—Observations on the genus *Aponogeton*, and on its natural affinities, by M. E. E. Planchon. The author proposes to place *Aponogeton* either among the *Alismaceæ*, as the type of a suborder intermediate between the *Alismaceæ* proper and the *Juncagineæ*, or to consider it as the type of a new family of *Aponogetaceæ*, characterized by the absence of a perianth, by the ovaries being distinct and definite in number, by its few anatropous ovules attached to the base of the cell, and above all

* We use this word here, as employed by Mr. MacGillivray, to designate the subfamily of which *Eolis* is the type. *Eolidina* had previously been employed in this enlarged sense, of which fact M. de Quatrefages does not appear to be aware.

† See Annals, vol. xiii. p. 158.

by the free gemmule, of which the primordial leaves sheath only at the base. Embryological figures illustrate the paper.—Boissier, Plantæ Aucherianæ (*Umbelliferæ*).

Giornale Botanico Italiano.

A new botanical journal, which promises to be a valuable addition to our sources of information, has been established in Italy by the Botanical Section of the Scientific Congress; Prof. Parlatore of Florence having undertaken the editorship, under the direction of a committee of the botanists resident in Tuscany.

It is divided into three portions, under the separate titles of 'Original Memoirs,' 'Botanical Literature,' and 'Botanical Intelligence,' each part being separately paged.

The first two numbers contain: preface, plan of the work, collaborators.—*Original memoirs*: Meneghini on Gaudichaud's theory of the merithallus; Savi on some Microscopic organs of Plants, especially of *Chrysanthema*; Parlatore on the spirit of the last and present centuries in regard to natural science; Parlatore, Monograph of the Fumarias; Meneghini and Savi on the appendages of *Acacia cornigera*; Savi, Morphological considerations on the leaf of *Arduina bispinosa*; Puccinelli, Additamentum ad Synopsin plantarum in agro Lucensi sponte nascentium.

Literature: Gussone, Floræ Siculæ Synopsis, 1842; Todaro, Orchideæ Siculæ, 1842; Puccinelli, Synopsis plantarum in agro Lucensi sponte nascentium, 1842; Tarsi, on the Irritability of the Pollen vessels of some plants.

Miscellanea: Parlatore, Intelligence respecting the Italian central Herbarium at Florence, and the consignments received there; on the Italian meteorological Archiv; various short notices and intelligence.

Books Received.

The Medals of Creation, or First Lessons in Geology and in the Study of Organic Remains. By Dr. G. A. Mantell.

Essays on Natural History, chiefly Ornithology. By C. Waterton, Esq.

A History of British Ferns. By Edward Newman. Second edition.

Elements of Comparative Anatomy. By Rudolph Wagner, M.D.; edited by Alfred Tulk. Part I. *Mammalia*; Part II. *Birds*.

PROCEEDINGS OF LEARNED SOCIETIES.

ZOOLOGICAL SOCIETY.

Dec. 12, 1843.—William Yarrell, Esq., V.P., in the Chair.

"Descriptions of new species of *Navicella*, *Neritina*, *Nerita*, and *Natica*, in the cabinet of H. Cuming, Esq.," by C. A. Récluz.

Navicella, Lamarck.

1. Navicella Cookii. *Nav. testâ elliptică, anticè angustatâ,*

convexâ, tenuiusculâ, transversim crebrè striatâ, subepidermide olivaceo-lutescente, supernè carneâ, lineolis transversis creberrimis lineas latiusculas efformantibus reticulatâ; interstitiis maculis oblongo-acutis lutescentibus, superioribus interdum latioribus pictâ; apice submarginali, integerrimo; aperturâ cærulescente, intùs croceâ; labio luteo-fuscescente.

Var. β. *Testâ carneo-violacescente, fasciis nigris radiantibus, basi ac lateraliter ramosis, lineis transversis nullis; aperturâ intùs croceo maculatâ; maculâ nigro latè marginatâ.*

Hab. "Island of Johanna, one of the Commoro islands; found in a small stream by the Rev. W. V. Hennah." H. Cuming.

2. Navicella lineata, Lamarck.

Var. γ. *Testâ lineolis transversis tenuissimis, undulatis, creberrimis, olivaceis, et maculis oblongis ac linearibus, lutescentibus pictâ; apice ferè marginali, subviolaceo, suprà albido, lævissimè biradiato.*

Hab. "Ganges, Bengal." H. Cuming.

Nerita, Linnæus.

Sect. A. *Labro intùs integerrimo; labio supernè nec emarginato.*

Gen. Neritina, Lamarck, Férussac, &c.

1. Nerita Siquijorensis. *Ner. testâ ovato-transversâ, posticè angustatâ, dorso-convexâ, supernè planulatâ, solidâ, longitudinaliter tenuiter et crebrè striatâ, spadiceo-reticulatâ, interstitiis maculis oblongis, anticè acutis, albidis seu lutescentibus pictâ; anfractibus $1\frac{1}{2}$; apice retuso; aperturâ extùs ovatâ, intùs lutescente; labio plano, margine et in medio vix arcuato et tenuiter crenato; labro subcontinuo, lateralibus rectiusculo.*

Var. β. *Testâ spadiceo-reticulatâ, fasciis albidis 2–3 cinctâ; labio externè fuscescente tincto.*

Hab. "Isle of Siquijor, in a small stream." H. Cuming.

2. Nerita africana. *Ner. testâ ovato-conoideâ, subepidermide nigrescente strigis nigris longitudinalibus creberrimis et maculis oblongis vel ovatis transversis, luteis, anticè acutis et nigro marginatis, subregularibus, undique pictâ; anfractibus tribus subconicis; infimo supernè rugis raris notato; spirâ vix prominulâ, apice erosâ; aperturâ obliquâ, extùs semi-oblongâ, intùs albido-cinerascente; labio convexiusculo supernè calloso, anticè plano, rectiusculo et lævissimè crenato.*

Var. α. *Anfractu infimo depresso; labro supernè vix fornicato et antrorsùm productiusculo; labio posticè lutescente.*

Var. β. *Anfractu infimo dorso convexo; labio posticè aurantio.*

Hab. "Island of Fernando Po, west coast of Africa; found in a small stream by Capt. Downs, R.N." H. Cuming.

3. Nerita (Clithon) Da Costæ. *Ner. testâ subglobosâ, suprà medium vix angulosâ, muticâ, olivaceâ, maculis triangularibus albidis, anticè acutè nigris pictâ et fasciis pallidissimè interdum obsoletis cinctâ; anfractibus quaternis plano-declivis; spirâ sub-*

conicâ, apice erosâ; aperturâ subrotundâ, intùs albâ et pallidè cærulescente 3–4 fasciatâ; labio compresso, angusto, valdè declivi, supernè transversim calloso, margine crenato et in medio tenuiter arcuato; labro infernè dilatato, supernè subfornicato.

Hab. "Isle of Negros, in a mountain-stream." H. Cuming.

4. Nerita Leachii, Récluz in Guérin, Rev. Cuvier. 1841, p. 312. no. 33.

Var. β. *Testâ subglobosâ, pallidè fuscâ, luteo-bifasciatâ.*

Var. γ. ? *Testâ subglobosâ, nigerrimâ, maculis punctiformibus vix triangularibus obsitâ, nec fasciatâ.*

An var. *Neritæ guttata*, Récluz in Rev. Cuv. 1841, p. 316. no. 40 ?

Var. δ. ? *Testâ semiglobosâ, tenuiore, striis longitudinalibus regularibus creberrimis, transversis, tenuissimis, nigerrimâ, maculis sparsis, raris, et fasciis angustis binis, lutescentibus, maculis parvulis triangularibus pallidioribus confertis pictâ.*

Hab. "Isle of Bohol; found in a small stream." H. Cuming.

5. Nerita Sayana. *Ner. testâ ventricoso-ovatâ, longitudinaliter substriatâ, tenuiusculâ, nitidulâ, nigratâ, maculis fuscis seu lutescentibus, diversiformibus, variegatâ aut fuscâ et nigrescente nebulatâ; anfractibus duobus; primo partim deroso, infimo supernè depresso; aperturâ subrotundâ, intùs albâ; labio calloso, plano, declivi, margine recto, in medio tenuissimè crenato.*

Hab. "Island of Guimaras, Philippines; in small streams." H. Cuming.

6. Nerita (Clithon) subpunctata. *Ner. testâ semiglobosâ, olivaceo-fuscâ, tenuiter rugatâ; rugis punctis nigrescentibus seriatis notatis, subepidermide albâ, nigro reticulatâ; anfractu unico, suprà medium anguloso; apice perforato; aperturâ extùs subrotundâ, intùs albo-cinerascente; labio semilunari, plano, supernè calloso, margine in medio tenuiter arcuato et crenulato; dente cardinali majore, truncato.*

Hab. "Sinait, province of North Ilocos, isle of Luzon; in a small mountain-stream." H. Cuming.

Sect. B. *Labro intùs sæpiùs sulcato; labio supernè emarginato.*

7. Nerita Grayana. *Ner. testâ ovato-globosâ, dorso obliquè conoideâ, transversim sulcatâ; sulcis costis latioribus, striis longitudinalibus creberrimis sculptâ; anfractibus sordidè nigro-violaceis, obsoletè albo maculatis; spirâ prominulâ, conico-depressâ, acutâ; aperturâ pallidè fuscescente; labio planulato, margine tridentato, suprà rugis confertis valdè impresso; labro intùs regulariter sulcato, supernè unidentato.*

Hab. "Port Curimao, province of North Ilocos, isle of Luzon; on the rocks at low water." H. Cuming.

8. Nerita Panayensis. *Ner. testâ parvâ, ovato-conicâ, aurantiâ, transversim sulcatâ, longitudinaliter crebrè striatâ; costis subter lente subgranosis; spirâ conico-acutâ; labio plano, lacteo, dentibus tribus remotis instructo; labro margine crenato, intùs calloso, lacteo, planè lævissimo.*

Var. β. *Testâ ventricoso-globosâ, spirâ vix exsertâ, minimâ, labio basi ruguloso et margine crenulis plurimis notato.*

Hab. "Ilo-Ilo, province of Panay; under stones at low water." H. Cuming.

9. Nerita Beaniana. *Ner. testâ ovatâ, posticè angustatâ, transversim crebrè et tenuiter sulcatâ, nigrâ sive olivaceo-nigricante, fasciis croceis cinctâ; spirâ obtusâ, decorticatâ; aperturâ albâ, fauce luteâ; labio compresso-plano, luteo-fuscescente, granulis nigris signato, margine lævissimè arcuatim excavato, subedentulo; labro intùs striis tenuissimis elongatis, nigris instructo.*

Var. β. *Testâ olivaceo-nigricante, lineis nigris et lutescentibus, æquidistantibus fasciatâ; labio suprà rugoso, medio nigro granuloso, labro intùs lævitèr incrasso et lævissimo.*

Var. γ. *Testâ costis subnullis, striis longitudinalibus creberrimis, obsoletisque.*

Operculum nigrescens, minimè granulatum, subtùs carneo-lutescente, fasciis tribus griseis pictum, costulâ planâ, obsoletâ, anticè marginatum. Dente apicali brevi, truncato, infimo transverso, arcuato, plano, posticè dilatato, truncato, superficie substriatâ.

Hab. "Isle of Corregidor, bay of Manila; under stones at low water." H. Cuming.

10. Nerita Hindsii. *Ner. testâ semiglobosâ, solidâ, cinereâ sive albidâ, nigro obscurè articulatâ, transversim lævitèr sulcatâ, striis longitudinalibus undulatis sulcis interdum decussantibus insculptâ; spirâ parvâ, convexo-depressâ, vix exsertâ; aperturâ dilutè stramineâ; labio angusto, compresso-subconcavo, rugoso et granuloso, margine in medio 2–4-denticulato; labro intùs valdè calloso et longè sulcato. Operculum pallidè cinereo-fuscescens, granulosum, obsoletè biangulosum, albido-viridescens, anticè angulum planissimum circumdatum. Dente apicali plano, supernè lævitèr incrassato, brevi, truncato, basi maculâ fuscâ notatâ; infimo arcuato, substriato, posticè parùm dilatato, truncato.*

Hab. "Ilo-Ilo, isle of Panay; under stones at low water." H. Cuming.

11. Nerita Spengleriana. *Ner. testâ orbiculato-conicâ, transversim lævissimè sulcatâ; sulcis basi obsoletis, albidâ, nigro-zonatâ; spirâ conico-acutâ, lutescente, nigro-punctatâ, sulcis profundioribus; labio albo, lævigato, margine subbidentato; labro intùs incrassato, lævissimo. Operculum pallidè fuscum, tenuissimè granulosum, subtùs pallidè rufum. Dente apicali obsoleto, infimo arcuato, transversim substriato, posticè superficie dilatatâ et truncatâ.*

Hab. "Ilo-Ilo, isle of Panay; under stones at low water." H. Cuming.

12. Nerita Rumphii, Récluz, Rev. Cuvier. 1841, p. 147. no. 10.

Var. 1. Récluz, *loco citato, Nerita polita oceani australis,* Chemnitz, Conch. v. p. 321. tab. 193. f. 2013 et 2014.

Hab. "Trenate, Molucca Islands; under stones at low water." H. Cuming.

Fauce nitidissimè rubro-sanguineâ.

Var. 2. *Testâ striis transversis nullis, fasciis viridescentibus immaculatis, alternis albis sive pallidè rufescentibus, nigro articulatis; aperturâ sanguineâ; labio bidentato; labro intùs crebrè sulcato.*
Chemnitz, Conch. v. p. 319. pl. 193. f. 2010.
" Island of Trenate, Molucca Islands; on the reefs."

Operculum Neritæ Rumphii. Forma *Ner. Orbignyanæ* accedens, sed diversa.

Var. 3. *Testâ albâ maculis nigris latis seriatis unifasciatâ.*
" Isle of Ticao; under stones at low water."

Var. 4. *Testâ albido-lutescente, nigro latè unifasciatâ.*
" Isle of Ticao, &c."

Var. 5. *Testâ nigrescente, ravido-fasciatâ.*
" Isle of Masbate; under stones at low water."

Var. 6. *Testâ nigrâ, albo angustè trifasciatâ.*
" Isle of Corregidor, off Manila; under stones."

Var. 7. *Testâ olivaceâ, nigro-variâ, in medio albo-unifasciatâ fasciâ lineis angustis olivaceis articulatâ.*
" Isle of Masbate; under stones."

Var. 8. *Testâ lutescente, cæruleo-undatâ, fasciis tribus è maculis rubris articulatis.*
" St. Nicolas, island of Zebu; under stones."

Var. 9. *Testâ nigrâ, venis albis et maculis concoloribus pictâ.*
" Trenate, Molucca Islands; under stones."

Var. 10. *Testâ rufescente aut cinereâ, maculis nigris hastatis transversis pictâ.*
An Chemnitz, v. p. 320. pl. 193. f. 2011 ? *Nerita pennata*, Deshayes in Lamarck, ed. alt. t. viii. p. 613. no. 23†. (vidi in collectione ejus) non Born, *Nerita pennata.* (Hæc est *Ner. piperina*, Chemnitz, Conch. xi. p. 73. tab. 197. f. 1905, 1906; Lister, Conch. Synops. pl. 604. f. 29; *Neritina piperata*, Sow. Conch. Illust. f. 18.)
" Port of Curimao, province of North Ilocos, isle of Luzon; under stones."

Var. 11. *Testâ rufescente aut albidâ, roseo-trifasciatâ et maculis viridibus parvis seu nebulis variâ.*
" Isle of Masbate; under stones."

Var. 12. *Testâ violaceâ, albo angustè trifasciatâ.*
" Isle of Corregidor, &c."

Var. 13. *Testâ luteo-rufescente, albo-trifasciatâ; fasciis nigro sive viridescente articulatis.*
" Isle of Burias; under stones."

Var. 14. *Testâ fusco-nigrescente pallidâ, fasciis tribus nigris, et maculis albis sparsis pictâ.*
" Isle of Siquijor, under stones; and port of Curimao, province of North Ilocos, isle of Luzon."

Var. 15. *Testâ luteo-rufescente, maculis albis transversis parvulis pictâ, nigrescente obsoletè trifasciatâ.*
" Trenate, Molucca Islands."

Var. 16. *Testâ nigro, ravido et albido-fuscescente fasciatâ.*
" Isle of Siquijor, &c."

Var. 17. *Testâ tenui, striis cancellatâ, fusco-rufescente, interdum maculis nigris parvulis hastatis pictâ; labio planissimo anticè valdè denticulato.*
" Isle of Siquijor, &c."

Var. 18. *Testâ albâ, rufescente fulguratâ sive roseo-trifasciatâ.*
" St. Nicolas, isle of Zebu, &c."

Var. 19. *Testâ lutescente, fasciis viridescentibus zonisque albis nigro-maculatis marginatis.*
" Isle of Ticao; under stones."

Var. 20. *Testâ albo-vinosâ, nigro latè bifasciatâ et in interstitiis interdum viridescente zonatâ.*
" Isle of Corregidor, bay of Manila."

Var. 21. *Testâ albâ aut fuscescente, venis nigris longitudinalibus pictâ et albo unifasciatâ.*
" Isle of Corregidor, &c."

Var. 22. *Testâ sordidè vinosâ seu fusco-violaceâ, fasciis tribus albis cinereo articulatis seu nebulosis.*
" Isle of Burias."

Var. 23. *Testâ purpureo-nigrescente, fuscescente nigro-punctatâ sive albo-bifasciatâ; fasciis cinereo nebulosis.*
" Port of Curimao, province of North Ilocos, isle of Luzon."

Var. 24. *Testâ albido-lutescente, nigro angustè bifasciatâ.*
" Isle of Corregidor."

Var. 25. *Testâ virescente, albo angustè trifasciatâ.*
" Isle of Corregidor."

Var. 26. *Testâ cancellatâ, totâ nigrâ.*
" Isle of Corregidor."

Var. 27. *Testâ fusco-nigricante, maculis nigris transversis intensioribus pictâ.*
" From Pasacos, isle of Luzon."

Var. 28. *Testâ griseâ, maculis albis obsoletè tessellatâ.*
" Isle of Ticao."

Var. 29. *Testâ pallidè fusco-rubellâ trifasciatâ, venis albis lineatâ, interstitiis albo angustè marginatis; fasciâ albâ spiram decurrente.*
" St. Estevan, province of South Ilocos, isle of Luzon."

Var. 30. *Testâ dilutè chocolatâ, albido-fasciatâ.*
" Isle of Burias."

Var. 31. *Testâ luteo-castaneâ, albo angustè trifasciatâ, transversim regulariter sulcatâ, seu lævissimè ad spiram tantum spiraliter cingulatâ.*
" Isle of Corregidor."

Var. 32. *Testâ omninò aurantiâ.*
" Jimmamaylan, isle of Negros."

NATICA, Adanson.

A. Umbilicum funiculatum.

Obs.—Funiculus. Columna callosa auctorum, columella adhærens et in umbilico spiraliter contorta, apice plùs minùsve dilatato, truncato, rariùs convexo aut rotundato.

* *Testa subglobosa; operculum testaceum.* Gen. *Nacca*, Risso.

1. NATICA PICTA. *Nat. testâ ventricoso-globosâ, tenuiusculâ, lævigatâ luteo-rufescente, albo angustè* 3–4 *fasciatâ: fasciis remotis maculis spadiceis sagittatis articulatis, superâ ad suturam spadiceo-marginatâ; spirâ convexo-conicâ, apice spadiceâ; aperturâ intùs fulvâ; columellâ rectâ, basim versus concaviusculâ, supernè breviter reflexâ; umbilico coarctato, quadrato; canali arcuato, extùs zonâ albâ maculis spadiceis undulatis radiato; funiculo crasso canalem angustante.*

Hab. "Basey, island of Samar, Philippines; found on the reefs." H. Cuming.

Testâ fundo pallidè chocolato, fasciâ supremâ rarò maculis supremis majoribus et intensioribus; anfractibus quinis, convexis, supernè depressiusculis.

2. NATICA EUZONA. *Nat. testâ ventricoso-globosâ, tenui, albâ, lineolis creberrimis longitudinalibus luteo-spadiceis et fasciis tribus è maculis sagittiformibus concoloribus, in supremâ angulatis pictâ; spirâ convexo-acutâ; aperturâ albidâ, basi et externè subacutâ; labio rectiusculo, supernè breviter reflexo et tenuissimo; umbilico rotundato extùs zonâ albâ maculis spadiceis circumdato; funiculo angusto, supernè interdum rotundato et dilatato cavitates angustante; labro fragili.*

Operculum testaceum, tenue, lineolis elevatis 2–3 *anticè cinctum.*

An *Nat. zebra*, var. ?

Hab. "With *Natica zebra* from Cagayan, province of Misamis, island of Mindanao; found in sandy mud at twenty-five fathoms: and with *Natica areolata* from the isle of Capul, Philippines; on the reefs." H. Cuming.

3. NATICA ORIENTALIS, Gmelin.

Var. γ. *Testâ rufâ, suturâ angustè canaliculatâ, albâ.*

Var. δ. *Testâ subepidermide fuscescente albidâ, suturâ canaliculatâ, epidermide fusco creberrimè striatâ.*

Var. ε. ? *Testâ minor, subepidermide pallidè fusco-albâ, zonis binis è maculis elongato-quadratis spadiceis seriatim pictâ; suturâ profundâ, epidermide fusco creberrimè striatâ; aperturâ basi minus auctâ et acutâ; funiculo coarctato.*

Hab. "Singapore; found in sandy mud." H. Cuming.

4. NATICA BRODERIPIANA. *Nat. testâ globoso-ovatâ, solidiusculâ, luteâ seu pallidè fuscâ, zonis albis spadiceo maculatis cinctâ, longitudinaliter tenuiter sulcatâ: sulcis supernè et infernè profundioribus; spirâ conico-acutâ, apice fusco-spadiceâ; suturâ fasciolâ albo marginatâ; aperturâ basi et externè angulosâ; columellâ in*

medio arcuatim concavâ, supernè et infernè incrassatâ; umbilico dilatato, profundo, zonâ albâ, lævigatâ circumdato; canali umbilico lineari; funiculo crasso, largo, depresso.

Testa anfractibus 5–6 *convexis, subcostatis. Maculæ fasciarum nunc quadratæ, nunc transversim oblongæ seu arcuatæ; fasciæ medianæ maculæ biseriatæ, infimæ parvulæ. Labrum solidum. Operculum testaceum, anticè striis tribus aratum, in medio costâ arcuatâ valdè exsertâ sculptatum; apice puncto calloso notato; posticè infernè ad marginem crebrè rugoso seu crenulato et in medio ventricoso.*

Hab. "Xipixapi, West Colombia; sandy mud, sixteen fathoms." H. Cuming.

5. Natica Elenæ. *Nat. testâ ventricoso-globosâ, posticè angustatâ, tenui, longitudinaliter striis æquidistantibus supernè et infernè profundioribus, striolis transversis creberrimis subcancellatis sculptâ; albido-stramineâ, lineolis crebris undulatis longitudinalibus pictâ; anfractu infimo supernè planulato; spirâ convexo-conicâ, subacutâ; aperturâ basi subangulosâ, supernè rotundatâ; labio subrecto, in medio subarcuato, supernè calloso; umbilico dilatato, profundo, spirali; canali lineari; funiculo lato, supernè crasso et obliquè truncato; labro fragili.*

Var. β. ? *Testâ minori, ventricoso-ovatâ, anfractibus senis, supernè planatis, gradatis, superioribus longitudinaliter striatis, infimo lævigato, lineis spadiceis remotiusculis subundulatis picto; spirâ conico-acutâ; columellâ rectâ, supernè et infernè incrassatâ; canali umbilico profundè arcuato, valdè latiore; funiculo angusto; aperturâ semi-oblongâ.*

Hab. "St. Elena, West Colombia; found in sandy mud at six fathoms." H. Cuming.

Testâ tenuiori, sulcis longitudinalibus striæformibus; anfractu infimo transverso, anticè dilatato posticèque angustato, fasciis nullis, lineis spadiceis crebris undulatis angulatisque; spirâ minori; columellâ minus concavâ; funiculo crassiore à Naticâ Broderipianâ *differt.*

Var. β. *Forma* Natica Fanel *Adansonii accedens sed diversa; an species nova?*

Umbilicus testaceus, anticè triangulatus, in medio costâ latâ, crassâ, exsertâ, sulco anticè cinctâ et posticè revolutâ insculptus, areâ posticâ arcuatim sulcatâ. Margo postica transversim crenulata: crenis inferioribus valdè impressis.

6. Natica areolata. *Nat. testâ ventricoso-globosâ, tenui, parvâ, subpellucidâ, glaucinâ seu luteâ, lineis angulato-flexuosis, sæpè basi latioribus arcuatisque pictâ, ornatis; spirâ convexo-conicâ, apice fuscâ; aperturâ subviolaceâ; labio obliquè rectiusculo, ad umbilicum subconvexo, basim versus arcuatim rotundatâ; funiculo crasso, supernè rotundato, plano umbilicum canalemque valdè angustante.*

Var. β. *Testa minor, maculis luteis anticè albo marginatis ac arcuatis subseriebus* 3–4-*cincta, interdum confluentibus; anfractibus supernè zonâ dilutè aurantiâ lineâ albâ marginatâ ornatis.*

Rumph. Mus. tab. 22. fig. G. *bona*, non *Natica zebra*, Lamk.

Hab. "Island of Capul: found on the reefs, Philippines." H. Cuming. Amboina (Mus. Paris et Rumphius).

7. Natica fulgurans. *Nat. testâ ovatâ, ventricosâ, tenuiter striatâ, albâ, flammeis fulgurantibus spadiceo-nigris interdum confluentibus pictâ; spirâ conicâ, acutâ; aperturâ albâ; columellâ obliquâ, rectiusculâ, umbilico profundo; canali latiusculo; funiculo depresso, supernè basique compresso; labro basi obliquè rectiusculo, crasso, compresso.*

Hab. "Le Senegal (Mme Dupont)."

Testa alba seu dilutè ravida; flammis interruptis in zonas transversas efformantibus sæpè dispositis.

8. Natica Colliei. *Nat. testâ ventricoso-globosâ, albâ, maculis spadiceo-fuscis quinque seriatis: seriebus duabus maculis rufis quadratis interdum angulatis alteris punctiformibus cinctâ; spirâ convexâ, apice acutâ; anfractibus supernè planiusculis, radiatim breviter striatis; aperturâ albidâ, intùs subflammulatâ; umbilico arcuato, profundo; funiculo parvo; columellâ obliquè rectiusculâ.*

Var. β. *Testa maculis quadratis quinque seriatis cincta; seriebus tribus medianis maculis majoribus interdum confluentibus; aperturâ intùs rosea; funiculo crasso extùs ad sinistram obliquè planulato, basi canali propinquiori.*

Hab. "Swan River, Australia; found on stones, low water, by Lieut. Collie, R.N. Var. from the island of Ticao found on the reefs." H. Cuming.

9. Natica Fanel, Adanson.

Var. β. *Testa alba, seu albo-subvinosa, maculis rotundatis atropurpureis, paucis interdum confluentibus picta.*

Natica variolaria, nobis olim.

Hab. "Zanzebar, east coast of Africa, collected by Mr. Thomas Thorre." H. Cuming.

Testa subglobosa, ovata, ventricosa, nitidissima, lævigata. Anfractibus senis, convexis, supernè depresso-planis, radiatim tenuiter striatis, ferè gradatis. Spira conica; apice acutiusculo. Apertura semirotunda, alba, obliquata. Columella obliquè recta, angusta, supernè breviter reflexa, adnata, basi in labro continuato et incrassato. Umbilicum semirotundum, fuscum, profundum. Funiculum depressum, latiusculum, rufum, supernè vix callosum, semiovatum, columellæ adnatum. Operculum?

10. Natica Gambiæ. *Nat. testâ ventricoso-ovatâ, interdum subglobosâ, crassâ, albidâ seu dilutè carneolatâ; anfractibus convexis, lævigatis, supernè longè radiatim striatis, superioribus suprà depresso-planiusculis; spirâ conico-depressâ, acutâ; aperturâ obliquâ, albâ; columellâ rectâ, supernè incrassatâ, callosâ; umbilico parvo; canali arcuato, profundo; funiculo magno, supernè dilatato, plano, semiovato; labro crasso.*

Var. β. *Testâ ovatâ, substriatâ, supernè cinereo-fuscescente, fusco*

obscurè zonatâ, infernè albidâ, submedio zonâ pallidâ cinctâ; spirâ glaucescente; aperturâ intùs fusco-purpurascente.

Operculum testaceum, solidum, ad apicem tenuiusculum, lacteum, posticè marginem versus fuscum, lævigatum, anticè lineâ angustâ circumdatum. Varietates innumeræ Naticæ maroccanæ *Chemnitzii* (*Nat. marochiensis* Lamk. non Menke nec Philippi, quæ est *Nerita* (Natica) *glaucina* Linné certè) *differt, formâ, facie, consistentiâ, umbilico, funiculo et operculo. Rara.*

Hab. "River Gambia; found on the sands by Mr. Beale of Jersey." H. Cuming.

11. Natica canrena, Lamk.

Nerita canrena, Linn., Mus. L. U. p. 674. no. 383. Synonymis et variet. exclusis.

Var. β. *Minor, tenuior, magnitudinis avellanæ, zonis tribus albis et totidem fuscis pallidis cincta; zonis albis medio ventris lineis arcuatis spadiceis ornatis, superâ maculis spadiceis arcuatis pictâ; suturâ fasciâ angustâ luteâ marginatâ, striis radiatis crebris sculptâ; umbilico parvo; canali profundo, arcuato, zonâ latissimâ albâ circumdato et maculis spadiceis remotis notatâ.*

Hab. "Jacna, isle of Bohol, Philippines; twelve fathoms, sandy mud." H. Cuming.

An eadem ut typus Linnei?

Var. γ. *Testâ, omninò albâ, ad suturam lacteo fasciatâ; labro fragili.*

Hab. "Island of St. Vincent, North America." H. Cuming.

12. Natica pavimentum. *Nat. testâ ovato-obtusâ, subglobosâ, parvulâ, exalbidâ, lacteo-quadrifasciatâ, supremâ latâ lineis rufis radiatis, tribus inferioribus angustioribus maculis quadratis rufis seriatis articulatis pictâ; spirâ convexo-rotundatâ, parvâ, vix prominenti; aperturâ albâ, obliquâ; columellâ rectâ, solidâ; funiculo semirotundo, umbilico parvulo omninò occultante.*

Var. β. *Testâ fasciâ medii ventris maculis longitudinaliter oblongo-quadratis remotioribus pictâ.*

Testâ anfractibus quinis, convexo-depressis, infimo convexiore; suturâ vix impressâ. Operculum?

Hab. "The island of Ticao, Philippines; found on the reefs." H. Cuming.

13. Natica Gualteriana. *Nat. testâ subovatâ, semigloboso-acutâ, tenui, subepidermide fuscescente albidâ, punctis quadratis spadiceis seriatis in medio ventris trifasciatâ, supernè lineis concoloribus obsoletisque decurrentibus ornatâ; anfractibus ventricosis, ad suturam longè et crebrè striatis, fasciâ albâ circumdatis; spirâ conico-acutâ; aperturâ dilatatâ, basi subproductâ et angulosâ; umbilico parvo; funiculo semiovato, suprà obliquè plano, umbilicum et canalem valdè occultante.*

Var. β. *Testa minor, fasciis punctorum in medio ventris ultimi duabus.*

Hab. "Sual, province of Pangasinan, island of Luzon; found at five to seven fathoms, on sand." H. Cuming.

** *Testa subovata seu ovata; operculum cartilaginosum, Gen.* Natica, *Risso.*

Mamillatæ, Récluz.

14. Natica Panamaënsis. *Nat. testâ ovato-globosâ, ventricosâ, ponderosâ, albidâ; anfractibus septenis, supremis depresso-convexis, infimo ad periphæriam depresso-planulato, suprà subanguloso, declivi seu convexiusculo, striis tenuissimis impresso; spirâ conicâ, acutâ; aperturâ obliquâ, oblongo-semilunari; columellâ supernè et anticè ventricosâ, valdè incrassatâ, calloso-lacteâ, convexâ, sub umbilico productiusculâ; umbilico profundo; funiculo intùs subobsoleto, externè oblongo, calloso et cum callo columellæ consolidato; labro tenuiusculo.*

Operculum cartilaginosum, radiatim tenuiter striatum, dilutè fuscum. Sinu Panama propria.

Hab. "Panama; found at ten fathoms in fine sand." H. Cuming.

15. Natica Flemingiana. *Nat. testâ ovato-oblongâ, crassiusculâ, lacteâ, nitidâ, politâ, lævissimè striatâ, anfractibus senis, depresso-convexiusculis, infimo ovato-convexo, supernè subconico; spirâ depresso-conicâ, apice exalbido; aperturâ angustâ, semirotundâ; columellâ obliquè rectiusculâ, in medio subconvexâ, externè callosâ, crassâ; umbilico profundo, supernè partim tecto, externè angulo vix notato circumdato, basi in canalem profundum arcuatum prolongato, à funiculo modificato.*

Junior. *Canali umbilico subconsolidato, lineari.*

Operculum cartilagineum, luteum, tenuissimum, margine antico hyalino zonatum, fasciâ latâ, purpureo-rufâ, apice revolutâ, superficie eleganter radiatim striatâ valdè differt. Testa interdum albo dilutè straminea seu ferrugineo partim tincta.

Hab. "Sorsogon, isle of Luzon; found in sand and small stones." H. Cuming.

Nerita mamilla, var. *lacteæ*, Linnæi valde affinis, sed spirâ acutâ et umbilico aperto differt. *Naticæ vavaoi* Le Guillou proxima, sed columellâ convexiore, basi et internè non angulatâ, rotundato-concavâ, angulo umbilici remotiore et lineæformi, canali umbilici angustiore et columellâ suprà medium convexiusculâ transversim nec sulco obsoleto instructâ dissimilis est. *Natica uber*, Valenciennes, ferè simillima, sed in hac operculum cartilagineum omninò luteum et striis tenuioribus, in *Nat. Flemingianâ.*

16. Natica dubia. *Nat. testâ ventricoso-ovatâ seu globoso-acutâ, lævigatâ, crassâ, ponderosâ, albido-stramineâ, ad suturam obscurè fasciatâ et transversim obsoletè striatâ; spirâ conico-depressâ, plus minusve prominulâ, acutâ; aperturâ semirotundâ, intùs submargaritaceâ; labio anticè recto, basi incrassato, supernè valdè calloso: callo suprà medium convexo; umbilico spirali, in canalem profundum arcuatumque prolongatum et funiculo modificatum sive ferè sive omninò obtecto; labro solido.*

Hab. "Chili?" H. Cuming.

Naticæ Flemingianæ proxima, sed solidiore, ventricosiore, ponde-

rosâ columellâ nec anticè convexâ, supernè valdè convexâ, umbilico interdum occultato, differt.

17. Natica uberina, Valenciennes in Mém. Géol. de Humboldt.
Var. β. *Testâ ovato-conicâ, obsoletissimè cancellatâ; anfractibus supernè conicis; spirâ elongatâ, conicâ; canali umbilici et capite funiculi magis elongati.*
Hab. "Casma, Peru; found in muddy sand, five fathoms." H. Cuming.

18. Natica Cumingiana. *Nat. testâ ovato-ventricosâ, luteo-aurantiâ, ponderosâ, supernè tenuiter et crebrè striatâ, nitidissimâ; anfractibus senis conico-depressis, infimo ventricoso, suprà lævissimè conico; spirâ conico-depressâ, acutâ, partim albâ; suturâ subobliteratâ; aperturâ oblongo-semilunari, albâ; columellâ lacteâ, rectiusculâ, in medio subconvexâ, supernè et externè incrassatâ, callosâ; umbilico patulo, spirali; canali largo, semirotundo, lacteo, bianguloso; angulo interno spirali, externo posticè carinato; funiculo lacteo, crasso, externè semirotundato, internè depresso, spirali, umbilicum modificante.*
Junior. *Testâ tenuiore, carneolatâ, spirâ lacteâ, angulis umbilici obsoletis; callo columellæ suprà umbilicum sulco transverso notato, in adulto vix conspicuo.*
Operculum rubicundum striis radiatum et tenuissimè longitudinaliter arcuatimque impressum, anticè zonâ hyalinâ circumdatum. Natica aurantia, *var.* lutea, *nobis* (*Nerita mamilla*, var. *lutea*, Linné), *proxima sed ventricosiori, majori et umbilico patulo, funiculato, diversa est.* Naticæ porcelanæ, *D'Orbigny multò major, ventricosior, aurantiâ ac non stramineâ dissimilis.*
Hab. "Island of Cayo, Philippines; found in sandy mud, deep water." H. Cuming.
Junior. *Naticæ fuscatæ*, nobis (*Nerita mamma veneris fuscata seu lutea*, Chemnitz, Conch., p. 282. pl. 189. f. 1932, 1933) accedens sed diversa.

19. Natica Powisiana. *Nat. testâ ventricoso-ovatâ, crassâ, nitidâ, rufo-purpurascente, interdum rufo obscurè fasciatis anfractibus senis convexo-depressis; infimo fasciâ suturali luteâ, latâ, ornato; spirâ conico-depressâ, albâ seu luteo tinctâ, acutâ; aperturâ semirotundâ, intùs albido-cinerascente; columellâ albâ, rectiusculâ, in medio subconvexâ, basi crassâ et obliquè rectâ, supernè callosâ; umbilico patulo, albo, spirali, in canalem latum extùs desinente; canali intùs subangulato, externè costulâ convexiusculâ, basin versus sensim crescente, supernè in umbilicum decurrente; funiculo semiovato, plano, intùs convexiusculo.*
Var. β. *Testâ aurantio-rufescente.*
Hab. "Moluccas." H. Cuming.
Natica Cumingiana valdè affinis, basi columellæ crassiori extùs obliquè truncata, angulo externo umbilici costæformi, rotundato, obtuso et in perforatione decurrente, angulo interno canalis majore et depressiore, apertura semirotunda, anticè dilatata sed non oblonga, et supernè aucta differt.

20. Natica Salangonensis. *Nat. testâ ovatâ seu oblongâ, cæruleo-fuscâ seu fulvâ, substriatâ; anfractibus quaternis depresso-convexis, supernè conicis et zonâ aurantiâ marginatis; spirâ conicâ, obtusiusculâ, pallidè cærulescente et albo fasciatâ; aperturâ semirotundâ, fulvo-castaneâ; columellâ rectâ, in medio vix convexâ, suprà crassâ, supernè angulo transverso calloso instructâ, ad umbilicum sulco notatâ; umbilico profundo, coarctato, fulvo-aurantio; canali arcuato, largo, funiculo supernè oblongo, basi sensim attenuato modificato.*

Operculum pallidè fulvum, radiatim striatum, tenue, et cartilagineum. Naticæ mamillaris, *Lamk.* (Natica fuscata, *nobis*) *proxima sed diversa.*

Hab. "Salango, West Colombia; found in sandy mud." H. Cuming.

21. Natica pyriformis. *Nat. testâ oblongo-pyriformi, lacteâ, substriatâ, nitidâ; anfractibus 5–6 convexiusculis, elongatis, supernè declivis: infimo ventricoso-conico, supernè depresso; spirâ elongatâ, conicâ, apice puncto fusco-notatâ; aperturâ obliquâ, subsemilunari, angustatâ; columellâ rectiusculâ, extùs supernè callosâ, basi cum funiculo suprà compresso consolidatâ, umbilico parvo, externè occultante et canali arcuato profundo angustante; labro tenuiusculo, subpellucido.*

Spirâ interdum supernè lutescente. Anfractus ultimus sæpè tenuiter striatus: striis inter oculum et lumen hyalinis.

Hab. "Ilo-Ilo, island of Panay; found on the sand at low water," H. Cuming: "and from Huan river, Australia; found in sandy mud by Lieut. Collie, R.N., ten fathoms."

22. Natica aurantia, Lamk.

Var. β. *Lutea seu straminea,* Nerita mamilla, *var.* lutea, *Linné, Mus. Lud. Olr.* p. 675. no. 386. Natica straminea, *nobis olim.* Natica sulphurea, *quorundam.*

Hab. "Philippines; found on the reefs." H. Cuming. Var. β. Amboina, Timor (Mus. Paris).

B. *Umbilicum nudum, pervium, nec funiculatum.*

* *Testa subglobosa, operculum cartilagineum.*

23. Natica violacea, Sowerby, Tankerville Catal.

Natica amethystina, Lamarck's collection.

Var. β. *Testâ globoso-ovatâ, ventricosâ, albâ seu lacteâ, maculis luteis seu dilutè chocolatis superioribus characteriformibus, medianis quadratis, inferioribus oblongis quinque seriatis pictâ; columellâ intùs et extùs pulchrè roseo-violaceâ.*

Hab. "Island of Ticao, Philippines; found in coral sand at four fathoms. Var. *a.* from the island of Masbate, Philippines; sandy mud." H. Cuming.

24. Natica Buriasiensis. *Nat. testâ parvulâ, ventricoso-globosâ, subepidermide luteo-olivaceo albâ, nitidâ, lævigatâ, lineis luteis longitudinalibus undulatis crebris, interdum maculis albis majoribus*

supernè et in medio ventris subtriseriatis pictá; spirá parvá, subconicá, acutá; aperturá semirotundá, in fundo violaceá; columellá rectá, basi crassiusculá, supernè callosá, callo fusco-rubente, suprà umbilicum parvum, externè reflexum, curvum, et angulatum, partim occultante.

Var. β. *Testá ad suturam fasciá albá, latá, spiram decurrente pictá; spirá apice fusco-violascente.*

Operculum testaceum, album, striis obsoletis ornatum, posticè margine tenuiter crenatum, anticè lineá elevatá cinctum, apicem versus lævissimè callosum.

Natica intricata (*Nerita intricata*, Donovan) *minor, minus globosa, umbilicus nec funiculatus differt.*

Hab. "Island of Burias, Philippines; found in sandy mud at seven fathoms." H. Cuming.

25. Natica Raynoldiana. *Nat. testá subglobosá, crassiusculá, tenuissimè et densè striatá, albá seu dilutè aurantio-fulvá, spadiceo trifasciatá et sæpè reticulatá; anfractibus spiræ depresso-convexis, infimo rotundato; spirá depresso-conicá, subacutá, fuscá; aperturá semirotundá, albá; columellá subrectá, utrinque arcuatá, supernè callosá, incrassatá; callo albo, umbilicum extùs albo-zonatum partim occultante.*

Var. β. *Testá dilutè aurantio-fulvá, spadiceo-trifasciatá nec reticulatá.*

Var. γ. *Testá albá seu albidá maculis spadiceis triseriatis cinctá interdum lineis reticulatá, seu lineis confluentibus subflammulatá.*

Var. δ. ? *Testá globoso-ovatá, albá seu pallidè aurantiá, lineis reticulatis pictá, nec fasciatá.*

An *Nerita arachnoidea*, Gmelin, p. 3674. no. 17 ? Chemnitz, Conch. v. pl. 188. fig. 1915, 1916, optima (Mus. Paris), non *Natica arachnoidea*, Lamarck (*Natica cruentata*, var. *trifasciata*, nobis).

Hab. "Zanzebar, East Africa; found on the sands by Mr. T. Thorre. Cagayan, province of Misamis, island of Mindanao; found on sandy mud." H. Cuming. Trincomalee, bay of Ceylon, by M. Raynaud (Mus. Paris). Var. ε. patriam ignoro.

26. Natica gallapagosa. *Nat. testá globoso-acutá, subepidermide dilutè olivaceo-albá, fasciá largá carneo-rufescente aut viridescente, supernè fasciá pallidè rufá cinctá; anfractibus quinis subplanis: infimo ventricoso, supernè declivi, planiusculo; spirá parvulá, conico-depressá, rufo-fulvá, acutá; aperturá semirotundá, albá, obliquá; columellá obliquè rectá, supernè calloso-angulatá, ad umbilicum parvum, partim occultante reflexá.*

Operculum cartilagineum, olivaceo-fuscum tenuissimè radiatim striatum, aperturá testæ minus.

Hab. "Gallapagos Islands; found in coral sand at Albemarle island." H. Cuming.

27. Natica pisiformis. *Nat. testá minimá, subglobosá, albido-viridescente, subpellucidá; anfractibus depressis, infimo ventricoso, supernè sæpiùs subanguloso, lævigatis; spirá depresso-conicá seu planulatá, vix exsertá; aperturá semirotundá; columellá rectá,*

supernè brevè reflexâ, adnatâ; umbilico punctiformi, subfuniculato. Operculum cartilagineum, tenuiter radiatim striatum, lutescens, in medio rubicundum? Tale ego vidi in apertură eâdem testæ.

Hab. "Valparaiso, Chili; found in coarse sand at forty-five fathoms." H. Cuming.

** *Testâ ovato-acutâ, tenuiusculâ, sæpissimè zonatâ; columellâ nigro aut fusco-purpurascente pictâ; operculo cartilagineo, oblongo; apertură angustiore.*

28. Natica Zanzebarica. *Nat. testâ ovato-oblongâ, tenui, subepidermide olivaceo-albâ, maculis fusco-purpureis elongatis interdum confluentibus trifasciatâ; anfractibus senis, convexis, tenuiter et crebrè striatis: penultimo maculis bifasciato, infimo ovato; spirâ conico-acutâ, albâ; apice fusco, minimo; apertură ovato-acutâ, columellâ suprà umbilicum adnatâ, reflexâ, fusco-purpurascente, anticè vix arcuatâ; umbilico profundo, extùs partim occultato.*

Hab. "Zanzebar." Mr. Thorre.

29. Natica Priamus. *Nat. testâ ovato-acutâ, ventricosâ, nitidissimâ, tenuè striatâ, zonâ pallidiore in medio cinctâ: zonâ lateraliter maculis spadiceis seriatis, sæpiùs remotis et quadratis marginatâ; spirâ parvâ, conico-acutâ, maculis fasciatâ, apice albo et puncto fusco notato; apertură ovatâ, basi et anticè dilatatâ, albido-fuscâ; columellâ suprà umbilicum adnatâ, chocolatâ, subarcuatâ, externè in medio albo unimaculatâ et reflexâ, umbilicum profundum zonâ extùs decurrente rufâ partim occultante; funiculo valdè depresso, vix conspicuo, in umbilicum continuato.*

Var. *β. pallidiore.*

Hab. "Moluccas," H. Cuming: Isle of France, M. Le Colonel Mathieu (Mus. Paris).

Natica maura, Lamarck's Encyclop., Sowerby, Tankerville Cat., *proxima sed major, ventricosior, tenuior, fasciata, columella tenuior valdè differt.*

30. Natica Samarensis. *Nat. testâ ovato-acutâ, albido et cærulescente longitudinaliter pallidè zonatâ, fusco-spadiceo transversim quadrifasciatâ: fasciarum maculis interdum flammæformibus aut confluentibus; spirâ conico-acutâ, albo cinctâ; apertură ovatâ, spadiceo-flammulatâ; columellâ omninò rufo-fuscâ, subrectâ, basi obtusè emarginatâ, supernè reflexâ, suprà umbilicum externè auctâ; umbilico ferè tecto, intùs spadiceo.*

Operculum cartilagineum, tenuiter radiato-striatum, angulo circulari in medio notatum, luteo-fuscescens, apertură testæ multò minus.

Hab. "Catbalonga, island of Samar, Philippines; under stones at low water." H. Cuming.

Natica Simiæ, Deshayes in Lamarck, An. s. vert. viii. p. 652. no. 45. (Lister, Conch. pl. 142. f. 36. *Ner. fasciatus è museo Oxoniensi*), *proxima, sed major, solidior, fasciis dissimilibus, columellâ omninò rufo-fuscâ differt.*

31. Natica sebæ, Souleyet, Voy. Bonite, pl. 35. fig. 6, 7. optime; Seba Mus., iii. pl. 41. f. 21. optima.

Var. β. *Testâ tenui, subepidermide straminea, exalbidâ, anfractibus supernè lacteo marginatis, columellâ et umbilico rufo-fuscis.*

Operculum tenue, rubrum, longitudinaliter creberrimè transversim radiatim valdè striatum.

Hab. "St. Nicolas, island of Zebu, Philippines; found under stones. This species is remarkable for the smallness of the operculum; the animal covers a part of the shell when at rest." H. Cuming.

Var. β. "Loon, isle of Bohol, Philippines; found under stones." H. Cuming.

GEOLOGICAL SOCIETY.

Nov. 1, 1843.—The following communications were read:—

1. "On the Fossil Remains of Star-fishes of the Order *Ophiuridæ*, found in Britain." By Prof. Edward Forbes.

After enumerating the several *Ophiuridæ* recorded as British fossils, the author described four new species, viz. 1. *Ophioderma tenuibrachiata*, and 2. *Ophiura Murravi*, discovered by Dr. Murray in the lias near Scarborough; 3. *Amphiura Pratti*, discovered by Mr. Pratt in the Oxford clay; and 4. *Ophiura cretacea*, communicated by Mr. Tennant, from the chalk. The animals of this order appear to have commenced their existence in the earliest periods of organic life, and to have continued to the present day without any great modifications of form, of family or generic value. They seem at present to be much more numerous than at any former period. None of the fossil species is identical with the existing.

2. "On the Geology of Malta and Gozo." By Lieut. Spratt, R.N., Assistant Surveyor H.M.S. Beacon.

The formations composing these islands are tertiary, and appear, from the author's researches, to belong to one geological epoch. They are all of marine origin, and very regularly deposited in parallel strata, but little inclined from the horizontal. They may be grouped under four divisions:—1. Coral limestone; 2. Yellow sandstone and blue clay; 3. Yellow and white calcareous sandy freestone; and 4. Yellowish white semi-crystalline limestone. Each of these groups is characterized by peculiar fossils, some of which are common to more than one. By a careful examination of the organic remains in each, the author was enabled to detect several extensive faults in both islands. These displacements amount generally to about half the present height of the islands above the sea, viz. about 300 feet, and the direction of the faults is transverse to the line of elevation, or the direction of the islands, that is, N.E. and S.W., the chain of islands running N.W. and S.E. Advantage of the irregularities of surface caused by these faults has been taken in constructing the military defences of the island. The author concludes with a detailed account of the several strata and their subdivisions, describing the distribution of the contained fossils, a collection of which accompanied the paper.

Nov. 15.—The following papers were read:—

1. "On some Fossil Remains of an Anoplotherium, and two species of Giraffe, from the tertiary strata of the Sewalik Hills in India." By Dr. Falconer and Capt. Cautley.

The Anoplotherium is an undescribed species, differing from those of the Paris basin, and much larger, its size being between that of the horse and of the Sumatran rhinoceros. It is founded on two upper jaws, with the near molars perfect. It is a true Anoplotherium, as distinguished from the subgenera of *Xiphodon* and *Dichobune*. The discoverers have named it *Anoplotherium Sivalense*. The remains were dug out of a bed of clay in the tertiary strata of the Sewalik hills, mixed up with bones of Sivatherium, *Camelus Sivalensis*, Antelope, Crocodile, &c. The authors describe two species of giraffe. The first, which they designate *Camelopardalis Sivalensis*, is founded on the third cervical vertebræ of an old animal, and they infer it to have been one-third smaller than the existing species. The bone is very perfect, and completely silicified. It measures 8 inches, while the same vertebra of the existing species is 11½ to 12 inches. The bone is more slender in its proportions than the existing one, and exhibits a series of specific differences in addition to the size. The second species they name *Camelopardalis affinis*, provisionally, from its close resemblance to the existing Cape Giraffe, in form and size of teeth, &c. The species is founded on two fragments of the upper jaw, with the back molars, and a fragment of lower jaw containing the last molar. The dimensions agree to within the tenth of an inch with those of a female head in the Museum of the College of Surgeons. The giraffe bones were found along with those of Anoplotherium, Camel, *Crocodilus biporcatus*, &c., in a clay bed in the Sewalik hills*.

2. Prof. Sedgwick commenced the reading of a paper, in continuation of his former memoir, "On the Geology of North Wales," and described a section across the Berwyns.

ASHMOLEAN SOCIETY.

Oxford, June 3.—Prof. Twiss read a paper in illustration of a collection of specimens of the Ova and Fry of the Salmon, presented to the Ashmolean Museum by Mr. A. Young, the manager of the Duke of Sutherland's fisheries on the river Shin, in Sutherlandshire. The collection consists of thirteen specimens of the ova, selected at intervals varying from twenty to one hundred and thirty-three days from the time of their being deposited, and ten specimens of the young fry from the day on which they were hatched, the one hundred and thirty-fifth after impregnation, to the time when they assume the silvery character of the smolt and descend to the sea, which in this case was one year and nine days after exclusion from the egg. The experiments of Mr. Young, which have now been carried on through a period of three years with the greatest care, confirm the previous observations of Mr. Shaw, in the Nith river in Dumfriesshire, in their general bearings, with such slight variations as the different characters of the respective rivers may account for. Mr. Young has ascertained that the average period required for hatching the ova of the salmon of the Shin river varies from one hundred to one hun-

* The first announcement of the fossil remains of the Giraffe was made by Capt. Cautley in the Journal of the Asiatic Society of Bengal, vol. vii p. 658 (15th July, 1838).

dred and forty days, according to the greater or less warmth of the weather. Mr. Young considers that the fish passes through the condition of parr, whose characteristics are the transverse bands, and assumes the silvery appearance of the smolt in about twelve months from the time of being hatched; and he is disposed to think, that some of the young fish which have been deposited as ova, and therefore hatched late in the season, do not assume the smolt appearance, nor go down to the sea at the end of the first year. Prof. Twiss called attention to the importance of these observations in connexion with the preservation of the young fish, which have hitherto not unfrequently been taken and destroyed, as if a distinct species of trout; to the increased facility of propagating peculiar breeds or races of fish, by transporting the ova, when impregnated, in water from one river to another; and to the great value of careful notices as to the spawning-seasons of the fish of different rivers, in connexion with a more discriminating system of legal regulations as to the fence months. Dr. Buckland gave some account of his visit to the experimental ponds at Drumlanrig, in company with Prof. Agassiz, who was himself conducting a series of analogous experiments on the trout of the lake of Neufchatel. He alluded to the great probable advantages of hatching the ova in artificial ponds, with a view to the preservation of the young fry. In the experiments of Agassiz, and Sir F. Mackenzie, Bart., it was found necessary to feed the young fry with the paunches of sheep.

Prof. Twiss afterwards read a letter from Mr. Young, of Invershin Bonar Bridge, N.B., respecting the propagation of Eels. The following are the more important conclusions:—The adults spawn in the summer months, in sand and gravel banks in the rivers, and do not descend to brackish water to deposit their spawn. The spawn becomes vivid in the following September and October, but remains under the gravel, in the spawning-beds, until the following April or May, depending entirely upon the heat and cold of the weather; and the adult eels, in place of emigrating, get into holes in the banks of the rivers, and underneath large stones, as soon as the water turns cold, and remain stationary until the warmth of summer again heats the water of the rivers.

MISCELLANEOUS.

DESCRIPTION OF A NEW SPECIES OF CUSCUTA.

The following description of a new *Cuscuta* by Dr. L. Pfeiffer of Cassel, occurs in the 'Botanische Zeitung' of Oct. 13, 1843. As some of the plants on which it is found are common with us, it is not improbable it may be met with in this country.

Cuscuta hassiaca, Pfr. Caule ramoso, floribus irregulariter *fasciculatis, pedunculatis*, fasciculis et floribus singulis bractea fultis, calyce campanulato 5-fido, tubo corollæ campanulato, limbum æquante, squamis convergentibus clauso, 5-fido, laciniis expansis, apice subcorniculato inflexis; stamin. 5 anthera brevioribus; stylis 2 filiformibus, *stigmatibus capitatis*.

This plant was collected on a very dry and sunny bank near Cassel, parasitical on *Anthemis Cotula, Barkhausia fœtida, Sonchus asper, Galium verum, Torilis nodosa*, &c., sometimes twining round them and adhering by lateral tubercles like *C. Europæa*, and at others lying detached in dense yellow masses on the ground. It is distinguished by its pedunculated flowers and capitate stigmas from all the other German Cuscutas. On referring to Dietrich's 'Synopsis' (1840), Dr. Pfeiffer found the characters of *C. Americana*, Pers., to come pretty near to it, but to differ in the umbellate flowers. From the Bengal *C. sulcata*, Roxb., it is distinguished by the absence of the furrows in the calyx, &c. The orange-yellow colour of the stems renders it very conspicuous when growing in any quantity —A. Henfrey.

Observations on the Habits of the Python Natalensis. By Thomas S. Savage, M.D., of Cape Palmas, Western Africa.

This serpent, when spoken of by travellers and residents, has been erroneously called 'Boa,' and thus confounded with the South American genus. There is a striking similarity, however, between the two, both in structure and habits, so that were it not for the arrangement of the subcaudal scales, one would be identified with the other.

During my residence here, which has been five years, I have seen a number of individuals of the serpent, but one however alive, which is the specimen I now send.

The first of which I had any authentic account was one that appeared on the Mission premises of the A. B. C. F. Missions. The facts in the case have been kindly furnished by my friend the Rev. J. L. Wilson. He informed me that it was attracted into the yard by a dog. He says in answer to my inquiries, "He was 14 feet long, and held the dog not more than two minutes before the natives came to his relief. I suppose that the snake had stretched himself across the path, and seized the dog in the act of jumping over him. I was too much frightened to observe what was the shape of the snake while he held the dog in his folds. I am inclined to think that he had nothing to fasten his tail to while he held the dog. None of the bones of the dog were broken, and I am inclined to think that he received no injury whatever.

"The snake did not let go his hold till he had received a fatal blow from a bill-hook. The dog then leaped up suddenly several times, as if he were not sure of having been extricated, ran around and entered the back-yard, but for some time appeared afraid of everything and everybody. His back only was *slimed*, and this could not be washed off, but gradually wore away in the course of a week or ten days."

The next individual of which I have heard was attracted into the house of a colonist, an old woman, by a hen and her chickens. An unusual noise was heard under the bed in the night, which awakened the woman. By a light she discovered the serpent in the act of seizing its prey; affrighted, she fled to the house of a neighbour, who came and captured him with his gun.

The third individual appeared upon my own premises early in 1837. An antelope was discovered by some workmen a short distance from

my house. Upon the first sight, the natives as usual raised a cry, when he suddenly disappeared among the bushes. They started in pursuit. But a few moments elapsed before they heard a cry from the antelope, which directed them to the spot, where they beheld the animal struggling in the folds of a large Python. They all fired simultaneously, and shot at the same instant both the serpent and its victim. The former I measured, and found it over 14 feet. The antelope was a large one, and it was difficult to believe that it could have been received through the throat of the serpent, comparatively so small. The head had been cut off and the body greatly mutilated before I saw it; but taking a section of the skin where the abdomen begins to expand above the vent, and not including the greatest volume, I stretched it moderately. It was very easily distended; and I soon satisfied myself, that without going beyond the natural power of expansion, it would have taken the body of the antelope.

It was skinned by the natives, and the flesh when denuded was of the most delicate white. It was divided among them, and not a particle, whether of skin or any other part, was lost. All was carried home, cooked and eaten. From the skin was made a soup. I was extremely disgusted at the sight of a man carrying off in his hand, with an air of great satisfaction, a string of the intestines. This and other serpents are eagerly sought by the natives for food.

I have seen two other individuals in the course of the present year: they were captured by natives who were clearing up their land for rice-farms. They were much mutilated by transverse gashes from these "bill-hooks." Three more, I was informed, were found upon the same piece of land, which led the individual to abandon it, from the superstitious notion that it could not yield a crop.

The next specimen is the one before me. It measured 10 feet in length, is young, and was captured on the 22nd of February by my associate, the Rev. Joshua Smith, on the premises of one of our *out-stations*. His account, in answer to my inquiries, is as follows: "I had retired for the night, but was wakeful and unable to get to sleep. About twelve o'clock I heard Fanny (a favourite dog) barking violently in the girls' school-house. The barking soon ended in a cry of distress. I thought it probable that a leopard had attacked her, as they often do carry off dogs and other domestic animals. I went down and walked around the house where there was a hole, affording Fanny ingress and egress. The moon shone brightly, but I could not see the cause of trouble, nor hear any noise. I called the dog by name, but she did not appear, nor could I hear anything except what I thought to be the hiss of some ducks that were shut up there. I opened the door, but still I could see nothing. I then went back to my chamber for a lantern, and returning opened again the door, when I discovered the dog in the folds of a serpent with her back downwards, and seemingly motionless. I went back to my chamber for a weapon, and finding only a country dagger, I returned accompanied by some men, and entered the school-house again with the lantern in my hand. The serpent was coiled twice or thrice around the dog, his tail grasping the foot of a bench, and his jaws fastened on her throat. His motion in compressing his prey may be compared to that of a cord when tightened around anything, and some one pulling first at

one end and then at the other. I thought it best to thrust the dagger into the snake as near the head as possible; but as that was hidden by the bench I could not see it, and I made a thrust through the lungs. It started and Fanny was thrown from its folds with a jerk, when its aim was to retreat by the way it had entered. I then withdrew the dagger and thrust it into the snake further back, so as to hold him till the men on the outside could disable him. As his head appeared they beat him with sticks, so as to prevent him from running away entirely."

To the above I will add, that Mr. Smith displayed great fearlessness on the occasion; for though there were on the spot a number of men, both colonists and natives, yet not one could be induced to follow him into the house. An attack from the serpent might have been apprehended, for he was evidently in a state of extreme hunger.

The general habit of this serpent in seeking for its prey is to lie in ambush near a frequented path or watering-place, and suspended from a tree, or with its tail fixed to some other object, suddenly dart upon the unwary animal. The attack is so sudden and violent that the victim is often prostrated and stunned, and then begins the dreadful process of constriction. A bullock was so much injured in a recent attack, as to be supposed beyond the possibility of recovery.

In making the onset, it is not always necessary that the tail should be coiled around a fixed object. The hooks or claws near the anus are sometimes protruded, it is said (and the evidence is wholly satisfactory), and inserted in the ground or under roots, thus affording a fulcrum which gives inconceivable force to the blow.

These horny processes, or rudimental feet as they have been called, are also serviceable in ascending trees: they are inserted into the ground and bark of the tree, constituting fixed points, which greatly facilitate the ascent. We have satisfactory testimony in proof of another habit that I have never seen mentioned, in which these hooks must be highly serviceable. It is said, that in fields more or less open they often raise their heads above the surrounding grass and shrubbery in search of prey; their application then in this act must be evident; protruded and penetrating the ground beneath the roots, they must afford great support to the body. In this position birds have been known to attempt to alight, mistaking it, in its motionless attitude, for a stick or stump, and thus to have fallen unwarily into its distended jaws.

Instances of its attack upon men are very rare, and never, probably, except when it is in a state of extreme hunger.

The natives fear them single-handed, but not in numbers. They seek them for food, esteeming them very highly on their *bill of fare*.

Its places of resort are streams and damp places. Almost all animals constitute its prey. It is not poisonous, as is well known. Its constrictive power is all that renders it formidable.—*From the Boston (U. S.) Journ. of Nat. Hist.* vol. iv. No. 2.

ON THE PLACE OF ISOETES IN THE SYSTEM.

Following the opinion of C. Richard, M. Bory de St. Vincent considers that the Linnæan genus *Isoëtes* has such distinct characters that it must be regarded as a natural family; to this it has been ob-

jected, that it would be unadvisable to increase the number of families by forming one containing only one or two species.

The *Isoëtes* are certainly not ferns, neither can they be classed with the *Lycopodiaceæ*, as some have proposed. In the flora resulting from the botanical explorations of the scientific commission of Algeria, the family of the *Isoëtaceæ* has not only been firmly established, but at least two or three species have been added.

In the first instance only two *Isoëtes* were known, both aquatic; the *lacustris* of the north, and *I. Coromandelia* of Hindostan. Prof. Delile found the *Isoëtes* of the pool of Gramont near Montpellier so different from the *lacustris* of Linnæus, that he has characterized it as a new species under the name of *I. setacea*. It is essentially southern, and has been found by Dr. Mogent in the Géradmer, an elevated lake of the Vosges. Subsequently a fourth *Isoëtes* was found in Brazil, and several others have been found in N. America, New Holland and the islands of the Pacific. Those which have been found in Algeria are of two kinds, and might be separated into two very distinct subgenera: the first composed of two or three species, like all previously known *Isoëtes*, aquatic; the second of two terrestrial species, which instead of growing at the bottom of lakes, are found in the driest and most exposed parts of the country. The *Isoëtes* of Algeria are—*Aquaticæ: 1. *I. setacea*, Del., *α Delilei*, *β Peyrremondii*; 2. *I. longissima* (n. sp.): ** Terrestres: 3. *I. Duriei* (n. sp.), and 4. *I. hystrix* (n. sp.).—*Comptes Rendus*, June 24, 1844.

METEOROLOGICAL OBSERVATIONS FOR JUNE 1844.

Chiswick.—June 1. Clear and fine. 2. Overcast and cold: fine: cloudy. 3. Light clouds and very fine. 4, 5. Very fine. 6. Slight rain: cloudy. 7. Overcast: boisterous. 8. Very fine. 9. Slight rain: very fine. 10. Fine: cloudy. 11—16. Very fine. 17. Hot and dry: cloudy. 18. Rain: fine. 19. Overcast: heavy clouds, with showers. 20. Overcast. 21, 22. Very fine. 23. Exceedingly clear: sultry. 24. Cloudy: hot and sultry. 25. Constant heavy rain. 26. Cloudy: fine. 27. Cloudy. 28, 29. Very fine. 30. Dry haze: overcast and fine.—Mean temperature of the month 2°·19 above the average.

Boston.—June 1. Fine. 2, 3. Cloudy. 4. Fine. 5. Cloudy. 6. Rain early A.M.: rain A.M. 7. Cloudy. 8. Cloudy: thermometer at 4 o'clock 75°. 9. Cloudy. 10. Fine: rain A.M. 11. Fine. 12. Fine: thermometer 4 o'clock 75°. 13. Fine: stormy all day. 14, 15. Stormy. 16, 17. Fine. 18. Cloudy. 19, 20. Cloudy: rain A.M. and P.M. 21. Cloudy. 22. Fine. 23. Fine: thermometer at noon 81°. 24. Fine: rain early A.M., with thunder and lightning: thermometer at noon 80°. 25. Cloudy: rain A.M. and P.M. 26, 27. Cloudy. 28—30. Fine.

Sandwick Manse, Orkney.—June 1. Cloudy. 2, 3. Bright: cloudy. 4. Showers: cloudy. 5—7. Showers: rain. 8. Bright: cloudy. 9. Cloudy: showers. 10, 11. Bright: drops. 12. Bright: rain. 13. Showers: bright. 14, 15. Showers. 16. Bright: clear. 17. Clear. 18. Drizzle. 19. Drizzle: drops. 20. Showers: drops. 21. Clear. 22. Fog. 23. Drops: clear. 24. Hazy: clear. 25. Clear: cloudy. 26, 27. Cloudy. 28. Cloudy: damp. 29, 30. Cloudy.

Applegarth Manse, Dumfries-shire.—June 1. Dry and withering. 2. Dry and withering: cloudy. 3. Fine. 4. Cloudy and threatening rain. 5, 6. Rain. 7. Very wet. 8. Fair, but cloudy. 9. Fair: threatening. 10. Showers. 11. One slight shower. 12, 13. Heavy rain. 14, 15. Fair. 16. Fair and fine. 17, 18. Rain. 19. Fair. 20, 21. Rain. 22. Fair. 23. Fair and warm: thunder. 24. Rain. 25. Showery. 26—30. Fair and fine.

Mean temperature of the month	55°·1
Mean temperature of June 1843	54 ·7
Mean temperature of spring-water	51 ·6
Mean temperature of ditto June 1843	50 ·7

Meteorological Observations made by Mr. Thompson *at the Garden of the Horticultural Society at* Chiswick, *near London; by* Mr. Veall, *at* Boston; *by the* Rev. W. Dunbar, *at Applegarth Manse,* Dumfries-shire; *and by the* Rev. C. Clouston, *at Sandwick Manse,* Orkney.

Days of Month.	Barometer.							Thermometer.							Wind.				Rain.			
	Chiswick.		Boston. 8¾ a.m.	Dumfries-shire.		Orkney, Sandwick.		Chiswick.		Boston. 8¾ a.m.	Dumfries-shire.		Orkney, Sandwick.		Chiswick. 1 p.m.	Boston.	Dumfries-shire.	Orkney, Sandwick.	Chiswick.	Boston.	Dumfries-shire.	Orkney, Sandwick.
1844. June.	Max.	Min.		9 a.m.	9 p.m.	9½ a.m.	8½ p.m.	Max.	Min.		Max.	Min.	9½ a.m.	8½ p.m.								
1.	29·998	29·949	29·55	30·06	29·97	30·11	30·13	72	44	57	67	44	56	45	ne.	calm	ene.	w.	.....	.....	.....	.....
2.	29·971	29·953	29·50	29·98	29·96	30·14	30·14	61	41	52·5	58½	46½	48	40	ne.	calm	e.	nw.	.....	.....	.....	.....
3.	30·123	30·057	29·55	30·00	30·00	30·04	30·00	69	41	53	64½	44	50	48	e.	calm	se.	w.	.....	.....	.....	.....
4.	30·147	30·057	29·60	29·94	29·86	29·92	29·93	79	40	60	64	41	50	46	sw.	calm	sw.se.	w.	.....	.....	.....	·20
5.	29·976	29·882	29·39	29·69	29·60	29·80	29·63	79	53	64	58½	52	49	48	sw.	calm	se.sw.	se.	·06	.....	.....	.....
6.	29·834	29·714	29·05	29·50	29·55	29·69	29·69	70	53	58	64	53	55	54	sw.	sw.	se.sw.	s.	·02	·08	.....	·16
☾ 7.	29·901	29·862	29·22	29·56	29·40	29·57	29·60	71	50	63	60½	52	56	53	sw.	sw.	s.	sw.	.....	·11	1·02	·22
8.	30·057	30·001	29·32	29·78	29·81	29·72	29·78	80	49	66	65	52	50	53	sw.	w.	s.	sw.	·02	.....	.....	·30
9.	30·009	29·983	29·29	29·78	29·80	29·74	29·73	80	51	63	61	52	62	53½	w.	calm	sw.	wsw.	·01	.....	.....	.....
10.	30·110	30·034	29·43	29·77	29·90	29·71	29·78	77	41	63·5	60	47	60	53	w.	calm	wsw.	wsw.	.....	.....	.....	·24
11.	30·186	30·143	29·63	30·00	30·00	29·92	29·97	83	42	65	63	45	52½	52	sw.	w.	wsw.	sw.	.....	·16	.....	·08
12.	30·166	30·080	29·55	29·96	29·78	29·90	29·62	82	56	66	63½	50	53½	50	sw.	w.	sw.	wsw.	.....	.....	.....	·18
13.	30·003	29·940	29·28	29·56	29·63	29·45	29·30	85	52	70	66	53	58	49	sw.	w.	wsw.	sw.	.....	.....	.....	·22
14.	30·030	29·999	29·35	29·68	29·74	29·93	29·50	75	49	63·5	58½	48½	47½	48½	w.	w.	wsw.	w.	.....	.....	0·42	·39
15.	30·046	30·009	29·42	29·80	29·92	29·71	29·92	78	43	58	57	47	47	46	w.	nw.	wnw.	nw.	.....	.....	.....	·18
● 16.	30·197	30·168	29·64	30·05	30·08	30·04	30·11	78	40	62	65	42	50	48	nw.	calm	wnw.	nw.	.....	.....	.....	.....
17.	30·153	29·925	29·67	30·03	29·83	30·08	30·03	77	52	64	57½	45½	55	50	s.	calm	sw.	w.	·04	.....	.....	.....
18.	29·757	29·676	29·28	29·72	29·70	30·00	30·00	77	54	57	53½	49	49½	47	e.	calm	n.	ne.	·05	.....	.....	.....
19.	30·014	29·858	29·35	29·84	29·86	29·98	29·92	66	46	59	52	46½	45	46	nw.	calm	nw.	n.	·02	.....	.....	·10
20.	30·041	29·972	29·54	29·80	29·70	29·79	29·75	74	53	56	58½	40½	49⅓	48	w.	calm	s.	w.	·01	·08	.....	·05
21.	29·980	29·761	29·42	29·67	29·60	29·71	29·70	83	52	63·5	63½	53½	51½	49	sw.	calm	sw.	w.	.....	·09	.....	.....
22.	29·797	29·769	29·19	29·55	29·68	29·63	29·73	86	48	66	64⅓	51	55	53	sw.	calm	s.	ese.	.....	.....	1·46	.....
☽ 23.	29·789	29·742	29·25	29·70	29·69	29·78	29·82	91	63	73	71½	54	55	55	s.	calm	s.	e.	.....	.....	.....	.....
24.	29·651	29·642	29·04	29·61	29·62	29·88	29·90	89	67	73	69	58	52	50	sw.	calm	ne.	ese.	.....	·13	.....	.....
25.	29·666	29·613	29·00	29·66	29·69	29·95	29·91	65	47	62	59	53	52	47½	sw.	calm	ne.	ne.	·62	·05	.....	.....
26.	29·784	29·718	29·26	29·80	29·77	29·90	29·92	67	51	59	55½	46	48½	47	n.	calm	ne.	ne.	·12	·79	.....	.....
27.	29·886	29·828	29·39	29·85	29·80	29·92	29·90	68	50	55	60	47	47½	48½	n.	calm	s.	n.	.....	.....	.....	.....
28.	30·016	29·949	29·50	29·97	29·90	29·94	30·00	74	47	58·5	67½	46	51	48	w.	calm	s.	nw.	.....	.....	.....	.....
29.	30·065	29·926	29·57	29·70	29·94	30·02	30·04	83	54	63	67	48	52	50	sw.	w.	ssw.	nw.	.....	.....	0·53	.....
○ 30.	29·936	29·850	29·47	29·90	29·79	30·00	29·96	79	50	65	67	47	50	47	ne.	calm	se.	nw.	.....	.....	.....	.....
Mean.	29·976	29·902	29·39	29·797	29·445	29·865	29·841	76·60	49·30	61·9	62·¼	48·¾	51·93	49·10					0·97	1·49	3·43	2·32

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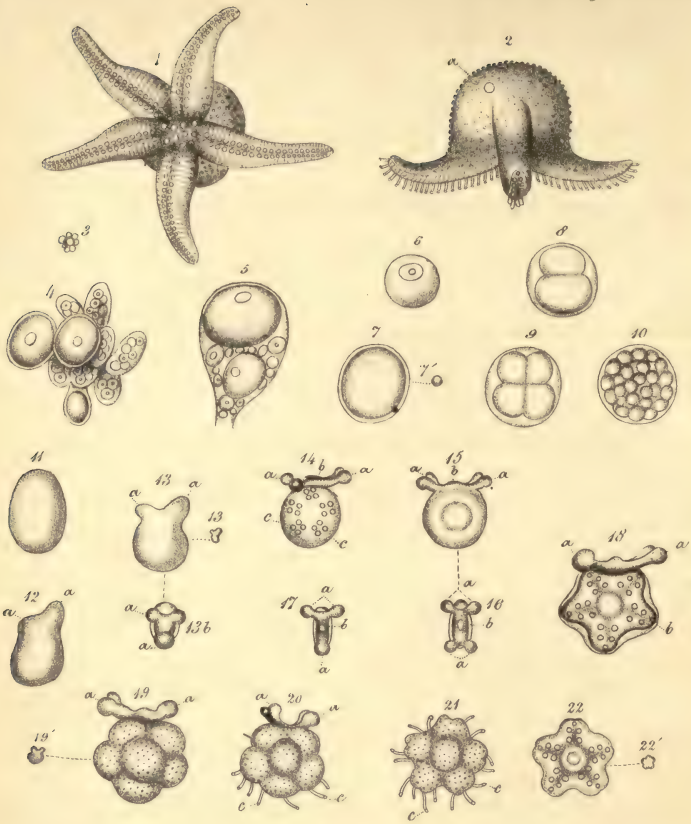

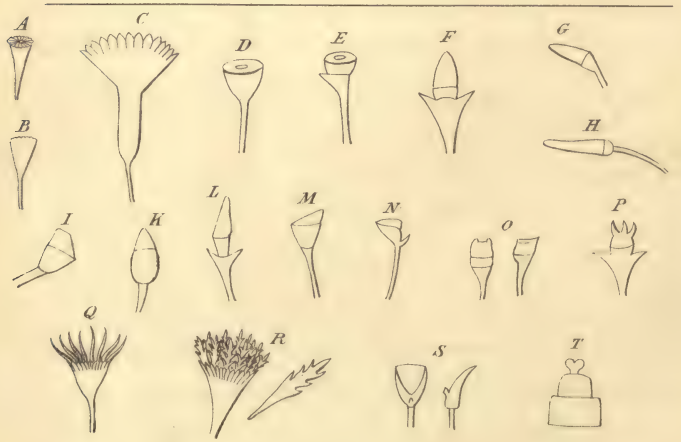

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THE ANNALS

AND

MAGAZINE OF NATURAL HISTORY.

No. 90. SEPTEMBER 1844.

XVIII.—*Some Observations on the Genus* Serpula, *with an Enumeration of the Species observed with the Animal in the Mediterranean.* By Dr. A. Philippi*.

[With a Plate.]

Few animals have been so much neglected by naturalists as the *Serpulæ*, frequent proofs of which assertion will occur in the course of these observations; it is on this account that I consider it advantageous to lay before the zoological public the results of my observations made on twenty-five species relative to the external structure of the animal; I shall reserve for a separate work more detailed descriptions, which will be accompanied by drawings.

Linnæus, in the 12th edition of his 'Systema Naturæ,' p. 1264, characterizes the genus *Serpula* thus: "*Animal* Terebella. *Testa* univalvis, tubulosa, adhærens (sæpe isthmis integris intercepta)." By the words "animal Terebella," Linnæus, although he has admitted several species of *Vermetus* among *Serpula* from his being unacquainted with the animals, has nevertheless excluded Adanson's *Vermetus*. The words "sæpe isthmis integris intercepta" refer solely to the shell of *Vermetus*, and must therefore be excluded from the diagnosis. Lamarck likewise adopts this false characteristic; but Blainville has correctly stated in the 'Dict. des Sciences Naturelles,' vol. xlviii. p. 550, that it is precisely in the absence of septa that the shell of *Serpula* differs from that of *Vermetus*. My former supposition, that the shell of *Vermetus* possessed exclusively a porcellanous nature, while that of the species of *Serpula* was calcareous, I must now retract, having become acquainted with true *Serpulæ* with a vitreous shell.

The true *Serpulæ* have been divided by modern zoologists into the following genera: *Serpula*, Lamk.; *Vermilia*, Lamk.; *Galeolaria*, Lamk.; *Cymospira*, Savigny, Blainville; *Spirorbis*, Lamk.; *Filograna*, Berkeley; *Protula*, Risso; *Spiromella*, Savigny, Blain-

* From Wiegmann's Archiv, Part 2. 1844. Translated by W. Francis, Ph.D.

ville. The characters on which these separations are founded are of different value. *Vermilia* and *Galeolaria* differ from *Serpula* solely by the structure of the operculum; according to Lamarck, *Serpula* possesses an 'operculum pedicellatum infundibuliforme aut clavatum (*corneum*)'; for some lines further he says, "cette opercule, par conséquent, *n'est point calcaire.*" (2nd ed. An. sans vertèbres, v. p. 361.) *Vermilia*, on the contrary, has an 'operculum *testaceum* orbiculatum, simplex'; and further on, '*à dos convexe, le plus souvent conique.*' (Ibid. p. 368.) *Galeolaria*, lastly, is said to possess an 'operculum testaceum compositum,' which, according to my observations however, does not consist of five to nine but of fifteen pieces; the number however may differ in the various species; at all events, the drawing in the 'Dict. des Sciences Naturelles' is decidedly bad. *Filograna*, Berkeley, is said to possess constantly two opercula, which has likewise been observed exceptionally in other species. *Protula*, Risso, and *Spiromella*, Blainv., have no operculum: Cuvier refers them curiously enough to *Sabella*.

The genera *Cymospira* and *Spirorbis* have been established according to the number of filaments into which the branchiæ are divided and according to their arrangement. In *Cymospira* the branchiæ are on each side divided into numerous filaments and rolled up spirally; in *Spirorbis* they consist only of three filaments; but these characters are of very slight value. The different species of *Serpula* which I have observed with the animal have 3, 4, 6, 7, 8, 10, 11, 13, 18, 30, 40, and more filaments to each branchia, and the larger their number the more requisite is it for them to adopt a spiral arrangement. I have likewise found in *Vermilia triquetra* and *Pomatoceros tricuspis* (see below), that the filaments of the branchiæ describe a spiral of one convolution of the kind represented ❩ when they are expanded. It appears therefore to me that no very accurate limits exist between spiral and non-spiral branchiæ. According to Blainville, the branchial filaments of the *Vermiliæ* have cirrhi only on one side, which I look upon as an error.

The mode of growth has likewise been taken into consideration, and those species with a spiral growth have been referred to *Spirorbis*; yet the likewise remarkably spirally wound *S. cereolus*, the animal of which is still unknown, is excluded. One of the principal results of my observations is, that no relation exists between the nature of the animal and the shell, except perhaps in the genus *Galeolaria*; this indeed is a sad result: thus, for instance, we have a *three-ridged* shell in three different sections, an *orbicular* shell in still more; in one division there are smooth orbicular, orbicular with longitudinal bands, triangular, quadrangular, &c.

From what has been stated above, the structure of the operculum is the best character upon which to form the subdivisions

of *Serpula*; this character has moreover the advantage that it may still be frequently observed in dried specimens preserved in museums. The structure however of the operculum is far more varied than hitherto supposed, and several new subdivisions must be made, of which the following are the characters:—

A. Animal with opercula. On each side of the neck *a short* membrane, *broad above* and *narrow beneath*, bearing seven fasciculi of bristles, the upper one being generally directed anteriorly (this structure is not known of *Galeolaria*). *Serpula*, Cuv.

a. Operculum *horny*, shallow or infundibuliform, ~~*curved*~~ *at the margin*, radiately ~~striped~~ above; supported on a subconical fleshy petiole. *Serpula* in the restricted sense.

b. Operculum *calcareous, forming a shallow disc, margin entire*. *Placostegus*, Ph. This operculum calls most to mind that of a gasteropod.

c. Operculum *calcareous, conical*, shortened or elongated, without appendage. *Vermilia*, Lamarck.

d. Operculum *calcareous, hemispherical*, with appendages (which are interiorly hollow). *Pomatoceros*, Ph.

e. Operculum calcareous? horny? consisting of an elliptical shallow plate which supports on the hinder portion two ramified horns, but on the anterior margin uncinate bristles; the branchiæ are rolled up spirally. *Cymospira*, Savigny, Blainv. The *Serpula gigantea*, Gm., which forms this division, I am not acquainted with from the original essays of Pallas and Home, but only from Blainville's 'Dict.' and from the copy of Home's figure given by Blumenbach (Abbildungen Naturhist. Gegenstände, no. 67).

f. Operculum *horny*, almost as in *a*, but provided on the upper side in the centre with moveable points, which (at least in one species) are likewise horny. *Eupomatus*, Ph.

g. Operculum calcareous? obliquely truncated?; shell small, always spirally wound?; branchiæ constantly? composed of few filaments. *Spirorbis*, Lamk. [The form of the operculum exhibited by the figure in the 'Dict. des Sciences Nat.' 1. fig. 2. is, precisely as in *Placostegus*, different from the form which I have observed in another species.]

h. Operculum *calcareous*, composed of very many pieces. *Galeolaria*, Lamk.

B. No operculum. The lateral membrane continued for half the length of the body, equally broad. *Apomatus*, Ph.

a. Branchiæ spiral. *Protula*, Risso; *Spiromella*, Blainv.

'Dict.' xlviii. p. 560*. [The description which Risso gives in his 'Hist. de l'Eur. Mérid.' iv. p. 405. is quite romantic, and does not in the least agree with the statements of Cuvier in 'Règne Animal,' ed. 2. vol. iii. p. 192, whose description is exactly in accordance with my own observations, which will be detailed under *b*.]

b. The branchiæ simply fan-shaped. *Psygmobranchus*, Ph.

I cannot agree with Cuvier in referring the last section, to which I have applied the name *Apomatus*, to *Sabella*. I would not lay any great stress on the fact that the *Sabellæ* form a membranous or coriaceous tube, while *Apomatus* forms a calcareous one; but I consider of great importance the fact, that in the *Sabellæ* all the rings of the body are formed alike and are provided with similar bundles of bristles, while in *Apomatus*, precisely as in *Serpula*, the first seven fasciculi of bristles are fixed in a membranous expansion, of which not a trace was indicated in the *Sabellæ* observed by me.

I will now pass on to the characters of the individual species.

1. Serpula, *L.* (*sensu strictiori*).

1. *S. echinata*, Gm., *testa* teretiuscula, protensa, flexuosa, rosea, transversim rugosa, carinis denticulatis, echinata. Diam. 2‴.
Animal branchiis albo coccineoque fasciatis, filorum (in utraque) 30 et ultra, operculo rubro. Gm. p. 3744; Gualt. t. 10 R.; Martini, 1. f. 8.

2. *S. pallida*, Ph., *testa* teretiuscula, protensa, flexuosa, pallide rosea, carina mediana conspicua, laterali utrinque obsoleta, striisque incrementi tenuibus subaspera. Diam. 1½‴.
Animal branchiis albo coccineoque fasciatis, filorum pauciorum quam in antecedente, operculo albido.

3. *S. triquetra*, L. ? ? *testa* triquetra, flexuosa, alba, altero, latere tota adnata. Diam. 2‴.
Animal branchiis albo coccineoque fasciatis, filorum circa 30; operculo coccineo, crenis circa 24 (according to the drawing; I forgot to notice the number of folds).

I do not however think that is the Linnæan species. Linnæus has not described the animal, and only saw small individuals; the subsequent citations of Baster, copied by Martini, Gualtieri and others, do not exactly correspond to my species, as they represent the shell much thinner. It should also be observed, that the shells of *Serpula triquetra*, *Vermilia triquetra*, and *Pomatoceros tricuspis* are difficult to distinguish without the animals. Would it therefore not be better to banish entirely the name *Serpula triquetra* of Linnæus ?

* The figure of Seba (i. t. 29. fig. 1, 2) does not agree, as already observed by Cuvier, with the diagnosis; it wants the disque of Cuvier or the thorax, "égalant au moins la moitié de l'abdomen."

4. *S. vermicularis*, L.? *testa* tereti, flexuosa, læviuscula, apice libero protensa, rosea; ore patulo; carina denticulata dorsali demum obsoleta. Diam. $2\frac{1}{3}'''$.

Animal branchiis omnino coccineis, filorum multorum; operculo coccineo, crenis plurimis. (Fig. A. Plate III.)

This species shows with how little judgement the *Serpulæ* have been investigated. Blainville, 'Dict.' *l. c.* p. 553, assigns to each branchia *seven to eight* digitations, while in the drawing we find on each side twenty-six! In the description he terms the operculum clavate with two minute horns; but this is the case, according to pl. 1. fig. 3, with the operculum of *Vermilia trinquetra*; and the figure of *Serpula vermicularis*, pl. 1. fig. 1, exhibits a totally different form of operculum, being according to the definition I have given above, that of a true *Serpula*. Is it possible to commit greater contradictions? Thus then, according to Blainville's *description* of the operculum, the animal is not a *Serpula* but must be a *Vermilia*, Lamarck, which genus Blainville adopts. Cuvier likewise states in the 'Regne Animal,' ed. 2. iii. p. 191, (according to Müll. Z. D.,) that the operculum has two or three small points, in which his species and Müller's would be a *Pomatoceros*.

[It is possible that nos. 1, 2 and 4 should be considered as mere varieties of one species.]

5. *S. aspera*, Ph., *testa* teretiuscula costis circa 7, crenulatis ornata, alba. Diam. $1'''$.

Animal branchiis fuscescentibus aut rubentibus, filorum 8 utrinque; operculo albido, crenis 16—24. (Fig. B.)

An *Vermilia scabra*, Lam.? The figure in Delessert's 'Recueil,' &c. is thoroughly bad, and the text in this work is, as is well known, of no assistance whatever.

6. *S. subquadrangula*, Ph., *testa* elongata, subquadrangula, angulis crenato-dentatis, carinis tribus, singulis in medio laterum liberorum. Diam. $\frac{3}{4}'''$.

Animal albidum, branchiis filorum 8 utrinque; operculo basi aucto, fuscescente, crenis admodum profundis, circa 24. (Fig. C.)

The fleshy petiole is not simply conically thickened at the extremity, but first cylindrically and then obconically.

7. *S. venusta*, Ph., *testa* tereti, transversim striata, varicibus pluribus ornata; alba, ore patulo. Diam. $3'''$.

Animal coccineum; branchiis filorum frequentium; operculi crenis circa 60.

The largest species which I have observed and preserved in spirits. The animal is $28'''$ in length, and $3'''$ in thickness.

2. Placostegus, *Ph.*

1. *Pl. crystallinus*, Scac., *testa* vitrea, triquetra, demum libera, et

carinis omnibus excurrentibus tricuspidata; carina dorsali serrata. Diam. $1\frac{1}{4}'''$.

Animal album; fasciis duabus fuscis in branchiis; filis circa 9 in utraque; pedunculo operculi simplici. (Fig. D.)

Serpula crystallina, Scac. Catalogo, p. 18.

Lives in great depths upon corals.

2. *Pl. fimbriatus*, Delle Chiaje, *testa* teretiuscula, seriebus 4—7 longitudinalibus appendicum falcatarum, pectinatarum, confertissimarum ornata. Diam. 1—$1\frac{1}{2}'''$.

Animal album; branchiarum coccinearum filis utrinque circa 9; pedunculo operculi appendice aucto. (Fig. E.)

Serpula fimbriata, D. Ch. Memorie, iii. p. 226. t. 48. f. 19, 20, testa (animal cl. auctori non innotuit).

3. Vermilia, *Lamk.*

1. *V. triquetra*, Lamk., *testa* triquetra, flexuosa, alba, altero latere adnata. Diam. $1'''$.

Animal branchiarum albarum, fusco-articulatarum filis numerosis? (saltem ultra 7); operculo elongato, subcylindrico, obtuso; pedunculo utrinque filum gerente. (Fig. F.)

Vermilia triquetra, Lamk. nr. 2. "Son opercule est conique."

Rare. See the previous observation respecting Linnæus's *Serpula triquetra*.

2. *V. infundibulum*, Gm., *testa* tereti, alba, multoties varicosa, quas ex infundibulis sese recipientibus conflata; ore quam maxime patulo. Diam. (oris) $4\frac{1}{2}'''$.

Animal branchiarum albo coccineoque fasciatarum filis multis; operculo elongato-conico. (Fig. G.)

Serpula infundibulum, Gm. p. 3745; Lamk. nr. 9. excl. var.; Delessert, Recueil, 1. fig. 8. ad specimen malum.

3. *V. clavigera*, Ph., *testa* tereti, lineis longitudinalibus elevatis quinque ornata. Diam. $\frac{5}{4}'''$.

Animal . . . . operculo valde elongato, subcylindrico. (Fig. H.)

The dry animal did not exhibit the branchiæ distinctly on being softened.

4. *V. calyptrata*, Ph., *testa* tereti, crassa, transversim corrugata. Diam. $1\frac{1}{2}'''$.

Animal fuscescens, collari lineaque in filis branchiarum viridibus, filis branchiarum 11; ciliis rufo-fuscis; operculo conum obliquum truncatum referente. (Fig. J.)

5. *V. multicristata*, Ph., *testa* tereti, lamellis 5, longitudinalibus, plerumque pectinatim incisis cristata. Diam. $\frac{3}{4}'''$.

Animal albidum; operculo parvo, conico, basi carnosæ, multo crasriori, subglobosæ insidente. (Fig. K.)

I likewise possessed only a dried specimen of this species, the branchiæ of which could not be disentangled.

6. *V. elongata*, Ph., *testa* obscure quandrangula, crassa, transversim rugosa, linea impressa dorsali. Diam. $\frac{3}{4}'''$.

Animal rubrum; branchiarum utrinque filis 6—8; operculo elongato-conico; pedunculo utrinque filum gerente [ut in *V. triquetra*]. (Fig. L.)

7. *V. quinquelineata*, Ph., *testa* tereti, lineis elevatis, longitudinalibus, lævibus, quinque ornata [ut in *V. clavigera*]. Diam. $\frac{1}{2}'''' — \frac{2}{3}''''$.

Animal branchiarum lutescentium filis utrinque 8, rubro maculatis; operculo conum brevem obliquum referente [fere ut in *S. calyptrata*]. (Fig. M.)

8. *V. polytrema*, Ph., *testa* triquetra adnata; carinis foris frequentibus perforatis. Diam. $1\frac{1}{2}''''$.

Animal coccineum, branchiarum filis utrinque c. 6; operculo forma coni obliqui brevissimi; pedunculo albido annulis tribus fuscis ornato et utrinque filum gerente [ut in nr. 1 et 6]. (Fig. N.)

In *Vermilia triquetra* and other triangular *Serpulæ*, the keels consist when broken through of a series of cells; in this species only the septa as it were of the cells are developed, and the three keels perforated by the rows of their apertures are highly elegant in appearance. The diameter of the tubes is very small, from the lateral adherent margins occupying the greater portion of the diameter.

9. *V. emarginata*, Ph., *testa* tereti, alba, carinis 3—4 sæpe in dentes antrorsum directos, dorso incisos elevatis. Diam. $1''''$.

Animal filis branchiarum utrinque 6—7; operculo formam coni obliqui truncati referente; pagina superiore marginata, antice emarginata, obscure bidentata. (Fig. O.)

I examined a softened specimen of the animal in Cassel.

4. Pomatoceros, *Ph.*

1. *P. tricuspis*, Ph., *testa* triquetra, sæpe in gyrum contorta, alba. Diam. $2'''$.

Animal branchiis albo et coccineo, sive albo et fusco fasciatis; filis ultra 18; operculo hemisphærico, vertice cornubus tribus acutis instructo; pedunculo utrinque filum gerente. (Fig. P.)

Very common. This appears to be the *Serpula triquetra*, Fr. Hoffmann, 'Verhandl. Berl. Gesells.' vol. iii. p. 150. It may probably likewise be *S. triquetroides* (!), Delle Chiaje, Mem. iv. t. 67. f. 15. without description. Does *S. vermicularis*, Cuv., 'Règne Anim.' ed. 2. iii. p. 191, likewise belong here? "son opercule en massue est armée de deux ou trois petites pointes."

Vermilia triquetra, 'Dict. des Sc. Nat.' pl. 1. fig. 3, appears to form a second species, the operculum of which, supposing the figure to be correct, consists of two appendages and supports a forked appendage, the two ends of the fork being obtuse.

5. Cymospira, *Savigny.*

No species belonging to this genus occurs, as far as I am aware, in the Mediterranean.

6. Eupomatus, *Ph.*

1. *E. uncinatus*, Ph., *testa* tereti, transversim rugosa. Diam. $1'''$.
Animal fuscescens; branchiarum albarum, fusco-fasciatarum filis utrinque 13; margine operculi inciso-dentato; cornubus octo; apice incurvo uncinatis. (Fig. Q.)

Not rare. Delle Chiaje, 'Memorie,' vol. iii. t. 48. fig. 21, figures a perfectly similar animal *with two opercula*, but calls it *Sabella euplæana*, and asserts that its shell consists of grains of sand!!

2. *E. pectinatus*, Ph., *testa* tereti, transversim rugosa, lineisque longitudinalibus obsoletis. Diam. $\frac{3}{4}'''$.
Animal fulvum; branchiarum filis utrinque decem, punctis coccineis ornatis; operculi margine crenato; cornubus duodecim, rectis, utrinque pectinatis, dentibus tribus acutis. (Fig. R.)

A specimen which I examined possessed *two* perfectly similar opercula.

7. Spirorbis, *Lamk.*

1. *Sp. Cornu Arietis*, Ph., *testa* spirali, tereti, concentrice striata; anfractu ultimo reliquos abscondente. Diam. totus gyri $4'''$.
Animal pallide aurantiacum, branchiarum albarum filis utrinque *quatuor*; operculo obliquo, subspathulato, in parte postica appendice brevi aucto. (Fig. S.)

The operculum is placed obliquely on the petiole as in *Cymospira*; the inferior or hinder margin is thicker, and supports a short, weak, bifid appendage; the upper or anterior margin is thin and simple. *Spirorbis nautiloides*, Lamk., is extremely common; I have not however had occasion to examine the animal.

8. Filograna, *Berkeley.*

I have not been able to observe the animal of this section. According to the short notice, without any statement respecting the source, in Lam. 'Hist.' &c. ed. 2. v. p. 621, "le nombre des appendices tentaculaires est de *huit*, dont deux garnis d'un opercule infundibuliforme." Are there really *eight* tentacular appendages instead of two? That would be highly remarkable. Or are the other six *appendices tentaculaires* the branchiæ?

9. Protula, *Risso* (*ex emendatione Cuvieri*).

1. *Pr. intestinum*, Lamk., *testa* magna, tereti, undato-torta, lævi, primum repente, deinde libera. Diam. $5'''$.
Animal (secundum Cuvier) branchiis aurantiacis.

Rare. I have never been able to obtain the animal. The synonyma are: *Serpula intestinum*, Lamk., no. 3; Delessert, Recueil, t. 1. fig. 7. bene.—*Protula Rudolphii*, Risso, Hist. Eur. Mérid. iv. p. 406. [Risso's description is so different from Cuvier's state-

ments, that notwithstanding the authority of Cuvier, and notwithstanding the great mistakes which so frequently occur in Risso's descriptions, we are inclined to doubt the identity.]—*Sabella Protula*, Cuv. Règne Anim., ed. 2. iii. p. 192.

10. Psygmobranchus, *Ph.*

1. *Ps. protensus*, Gm., *testa* tereti, lævi, protensa, elongata, parum versus finem attenuata. Diam. $2\frac{1}{4}'''$.

Animal flavescens; branchiarum filis utrinque ultra 40, albis rubro annulatis; membrana laterali lutea, maculis septem rubris.

Serpula protensa, Gm. p. 3744; Rumph. t. 41. f. 3; Martini, 1. fig. 12 A.

Although Rumphius's figure represents a species from Amboina, I cannot detect in the figure any difference between it and my species.

2. *Ps. cinereus*, Forsk., *testa* filiformi, *glabra*, varie flexa. Diam. $\frac{1}{3}$—$\frac{1}{4}'''$.

Animal pallide aurantiacum, branchiarum coccinearum filis utrinque *quatuor*.

Serpula cinerea, Forsk. fn. arab. p. 128; Gm. p. 3747.

3. *Ps. intricatus*, L., *testa* filiformi, flexuosa, tereti, *scabra*, medio subcarinata, valde rugosa. Diam. $\frac{1}{3}$—$\frac{1}{4}'''$.

Animal aurantiacum; branchiarum albarum filis utrinque tribus.

Serpula intricata, L., ed. 12. p. 1265; Gm. p. 3741. Very common.

I am in doubt about the following species, having only seen a single specimen.

Apomatus ampulliferus, Ph., *testa* transverse rugata, dorso sulcis duobus longitudinalibus, approximatis bipartito. Diam. $\frac{1}{2}'''$.

Animal operculo nullo; branchiis flavidis, filis utrinque 7, punctis purpureis ornatis; *filo uno in vesiculam sphæricam* terminato.

I should have looked upon this curious formation without hesitation as a monstrosity, if my friend Scacchi had not observed, a few years previously, the animal likewise with the vesicle.

Observation.—In the work 'Actinien, Echinodermen und Würmer des Adriatischen und Mittelmeeres,' by Dr. Grube, there is represented in fig. 11 the bristle of *Serpula latisetosa*. This name does not occur at all in the text p. 90, but there is a *Sabella latisetosa*; and in my copy, pages 57 to 64 are wanting. According to the catalogue, p. 90, the author collected the following species:—

Serpula intricata, L.

——— *glomerata*, L. The Linnæan species is, according to the authorities quoted, *Vermetus triquetra*, Born.

——— *plicaria*, Lam.

——— *infundibulum*, Gm.

——— *vermicularis*, L.

Serpula proboscidea, Gm. Founded on two figures of Martini which I do not venture to explain.
——— *protensa*, Gm.
——— *echinata*, Gm.
——— *contortuplicata*, L.
——— *decussata*, Gm. Founded on Lister, t. 547. f. 4. (copied in Martini, 2. f. 17.) from Barbadoes, and is probably a *Vermetus*: I suspect that Dr. Grube has conceived under this name *Vermetus subcancellatus*, Born.
Spirorbis nautiloides, Lam.

EXPLANATION OF PLATE III.

Fig. A. The operculum of *Serpula vermicularis*, L.
Fig. B. ——— *aspera*, Ph.
Fig. C. ——— *subquadrangula*, Ph.
Fig. D. The operculum of *Placostegus crystallinus*, Sc.
Fig. E. ——— *fimbriatus*, D. Ch.
Fig. F. The operculum of *Vermilia triquetra*, Lam.
Fig. G. ——— *infundibulum*, Gm.
Fig. H. ——— *clavigera*, Ph.
Fig. J. ——— *calyptrata*, Ph.
Fig. K. ——— *multicristata*, Ph.
Fig. L. ——— *elongata*, Ph.
Fig. M. ——— *quinquelineata*, Ph.
Fig. N. ——— *polytrema*, Ph.
Fig. O. ——— *emarginata*, Ph.
Fig. P. The operculum of *Pomatoceros tricuspis*, Ph.
Fig. Q. ——— *Eupomatus uncinatus*, Ph.
Fig. R. ——— *pectinatus*, Ph.
Fig. S. The operculum of *Spirorbis Cornu Arietis*, Ph.
Fig. T. The operculum of *Vermilia triquetra*, Blainv., according to the 'Dict. d. Sci. Nat.' planches. From the description, it would be the operculum of *Serpula vermicularis*.

XIX. — *Catalogue of Irish Entozoa, with observations.* By O'Bryen Bellingham, M.D., Fellow of and Professor of Botany to the Royal College of Surgeons in Ireland, Member of the Royal Zoological, Geological and Natural History Societies of Dublin, &c.

[Continued from vol. xiii. p. 430.]

Genus 13. Pentastoma.

(Derived from πέντε, *quinque*, and στόμα, *os*.)

Gen. Char.—Body flattened or slightly cylindrical. Mouth situated between two pores upon each side, each pore having a hook-like process projecting from it. The five orifices placed in a lunate manner upon the head.

The genus *Pentastoma* is named so from the presence of five pores upon the head, the central one being regarded as the mouth. Rudolphi separated it from the genus *Polystoma* with

which it had been previously united; he likewise removed it from the order *Cestoidea* to *Trematoda*, to which it properly belongs.

The species are not numerous; they inhabit the frontal sinus, the lungs or peritonæal cavity, and never occur in the alimentary canal. Hitherto species of this genus have been found only in a few mammalia and reptiles; they have never been detected in either birds or fish.

Pentastoma tænioides *. Frontal sinus of dog (*Canis familiaris*).

Order 4. CESTOIDEA.

(Derived from κεστὸς, *cingulum*, and εἶδος, *forma*.)

The order *Cestoidea* is characterized as follows. Body elongated, flattened, soft, continuous or articulated. Head very seldom provided with simple lips, but in almost all cases furnished with two or four *bothrii*, depressions or suckers: all the individuals hermaphrodite.

The Entozoa included in the order *Cestoidea* do not form a very natural family; the head differs so much in the several genera; in some being flattened, pyramidal or tetragonal, with two or four opposite depressions, while in others it is truncate, hemispherical or globular, and provided with a proboscis which is often armed with a circle of hook-like processes. The neck is as frequently absent as present. The body is elongated, flat, soft, continuous or articulated, with marginal or central pores. The species occur in mammalia, birds, reptiles and fish. They inhabit almost exclusively the alimentary canal.

Genus 14. Scolex.

(Derived from σκώληξ, *vermis*.)

Gen. Char.—Body flattened, soft and continuous, without any trace of articulation, enlarging into a head anteriorly, posteriorly attenuated. Head tetragonal, provided with four ear-shaped depressions.

This genus was established by Müller, and has been adopted

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* The *Pentastoma tænioides* was named so from its resemblance to the *Tænia*: it is not a common species; I possess but a single specimen.

It measures upwards of 2½ inches in length, and half an inch in breadth at its widest part. Colour whitish, of a dirty yellow-brown along the median line. Body flattened, anteriorly broad, and diminishing gradually to the posterior extremity; marked with numerous transverse elevated lines, resembling the joints of the *Tænia* when contracted; margin crenate; dorsal surface prominent along the median line. Pores five in number, small, and placed in the form of a half-moon upon the abdominal surface of the anterior extremity. The two lateral pores upon each side of the mouth of an ovate shape, with a little, sharp, hook-like process projecting from each.

by all zoologists since. It contains but a single species, and is confined almost exclusively to fish, never occurring in either mammalia, birds or reptiles; the alimentary canal is the usual habitat, rarely the abdominal cavity.

M. Leuchart looks upon the *Scolex* as the young of the *Anthocephalus*, but without reason. De Blainville, amongst other characters, describes two red spots as seen at the posterior part of the head of the animal; I have only observed this in the *Scolex* from the sole (*Solea vulgaris*). Rudolphi in his first work, 'Entozoorum Historia Naturalis,' distinguished six species of *Scolex* (four of which were doubtful); but in his last work, 'Synopsis Entozoorum,' he admits but one species, the *Scolex polymorphus*.

Scolex polymorphus.	Intestines of turbot (*Pleuronectes maximus*). Intestines and pyloric appendages of holibut (*Hippoglossus vulgaris*). Intestines of sole (*Solea vulgaris*). Stomach and intestines of dab (*Platessa Limanda*). Pyloric appendages of ling (*Lota Molva*). Intestines of conger-eel (*Anguilla Conger*). Intestines of lump-sucker (*Cyclopterus Lumpus*).

Genus 15. Tetrarhynchus.

(Derived from τετρὰς, *quatuor*, and ῥύγχος, *proboscis*.)

Gen. Char.—Body flat, continuous, without articulations, terminating posteriorly in a simple or forked extremity. Head provided with two lateral bipartite depressions (appearing at times to constitute four), and with four short retractile tentacula armed with recurved hooks.

This genus was established by Bosc under the name *Hepatoxylon*; subsequently Rudolphi changed it to *Tetrarhynchus*. It is not numerous in species, twelve only being enumerated by Rudolphi. The species are almost confined to fish; one occurred in the turtle, but they have never been found in either mammalia or birds. They seldom inhabit the alimentary canal.

1. *Tetrarhynchus grossus* *.	Abdominal cavity of salmon (*Salmo Salar*).
2. ———— *solidus* † (Drummond).	Abdominal cavity of salmon (*Salmo Salar*).

* The *Tetrarhynchus grossus* I have inserted on Dr. Drummond's authority, as I have not met with it. He has given a figure and description of this species in the second vol. of the new series of the 'Magazine of Nat. History,' p. 571.

† The *Tetrarhynchus solidus* was discovered and named by my friend

Genus 16. Ligula.

(Derived from *ligula*, a *strap*.)

Gen. Char.—In the first degree of its development. Body very long, flat, continuous, without articulations, having a central longitudinal depression; without any appearance of head or of organs of generation.

In the perfect state. Body very long, flat, continuous, without articulations. Head provided with a simple depression upon each side; ovaries in a single or double series, with the lemnisci in the median line.

The genus *Ligula* was established by Bloch and Goëtze, and has been adopted by zoologists since. The species are not numerous, seven only being enumerated by Rudolphi. They occur in birds and fish (principally the fresh-water species); one species has been found in the seal (*Phoca vitulina*). They inhabit the abdominal cavity of fish, and the alimentary canal of birds.

The opinion put forward by Rudolphi of the mode of development of the *Ligula* is curious, viz. that it begins life in fish, and arrives at its perfect state of development in birds which feed upon these fish. He founds his conclusion upon the fact, that the *Ligula* occurs only in the peritonæal cavity of fish and in the intestinal canal of birds; in addition, he has never, in the *Ligula* of fish, found the ovaries developed as they are in birds; and in Austria, where the fish which commonly contain *Ligula* do not occur, he never could discover the *Ligula* in the aquatic birds. However, Bremser does not coincide with Rudolphi upon this point; and De Blainville asks very naturally, what is the use of the ova being developed in the ovaries of the *Ligula* of birds? and how do these find their way into the abdominal cavity of fish?

The *Ligula* appears to be the only species of Entozoon ever used as food by man. I have learned from my friend Dr. Scouler, that in some parts of Italy where the *Ligula* is particularly abundant in the fish, this species affords a favourite food to the people.

Ligula sparsa. { Small intestines of crested grebe (*Podiceps cristatus*).

Dr. Drummond of Belfast, who was kind enough to communicate specimens to me; recently I found a single specimen of this species in the abdominal cavity of the salmon (*Salmo Salar*); it lay loosely attached to the peritonæal coat of the intestines by the proboscides of the head. I can bear testimony to the accuracy of the description given of it by Dr. Drummond, which is contained in the same vol. of the 'Mag. of Nat. Hist.' as that last noticed, and is illustrated by several figures. I shall only add, that in the recent animal a number of bodies like ova were seen, with the assistance of a lens, upon each side of the depressions on the head, lying apparently under the integuments.

XX.—*On the Fructification of* Polysiphonia parasitica, *Grev.*

By the Rev. David Landsborough*.

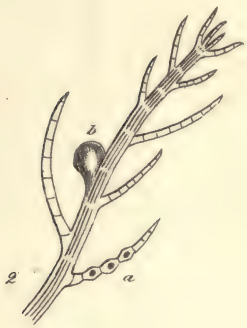
[With a Plate.]

Were I to be asked by a friend to point out the richest field on our Ayrshire coast for a botanical ramble, I would without hesitation point to Portincross in the parish of West Kilbride. It is however a place of so much beauty and interest, that I would advise my friend to spend an hour at least in enjoying the scene before he enters on his botanical researches.

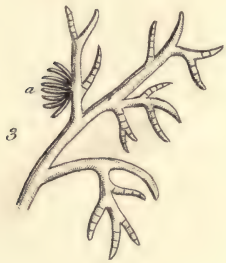
The name of the place carries us back to olden times. It was called Portincross, it is said, from being the harbour from which it was usual to sail, when the body of any of the kings of Scotland was to be carried to Iona, where the remains of so many of our Scottish monarchs were deposited. The ancient castle on the rocky shore carries us back also to a remote age; for though it is of more recent date than the period when Iona was a place of note for learning and religion and royal sepulture, yet it is so antique that we have no sure history of its erection. An ancient cannon, seen at the castle, brings us within the range of historical *memorabilia*, for it was brought up from the deep after the wreck of one of the vessels of the Spanish Armada, when Providence so evidently interposed in behalf of our land. The name of the proprietor of the castle and of the adjoining lands awakens pleasing recollections. *Crawford of Auchenames* sounds well in the ears of every lover of Scottish song, as an ancestor of the present proprietor wrote some of those sweet pastorals which have been rendered still more precious by being married for several generations to some of the sweetest of our Scottish airs.

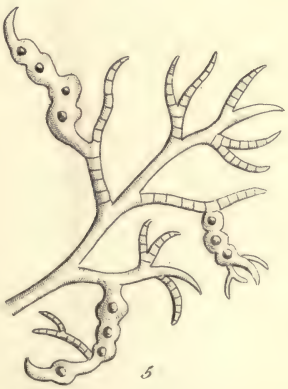
I shall not attempt to describe the scenery, for that would require a gifted pen to do it any justice. Let our botanist feast his eyes for a little, and then let him enter on his pleasant work. Is he in search of Phænogamous plants? In rambling along the sunny 'banks and braes,' he will not be long in filling his vasculum. Is he a muscologist? There, some half-score years ago, along with Mr. George Gardner, now in Ceylon, and well known in the botanical world, I for the first time met with *Hookeria lucens* and *Neckera crispa*, which though not the rarest are among the most beautiful of our mosses. *There*, are *muscosi fontes*, and shaded rocks, and veteran stone-dykes, and decaying stumps of trees, favourite habitats of the mossy tribes. And when he has perambulated the sunny *braes*, and explored every pendent cliff and crevice of the rocks, and robbed of its golden garniture every

* Read to the Botanical Section of the Glasgow Philosophical Society, 25th June, 1844, by William Gourlie, Jun.



Polysiphonia parasitica.





Gloiosiphonia capillaris.

J.D.C.Sowerby *fecit*.

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stone and stump, let him as a happy algologist turn to the sea, and he will there find a rich and inexhaustible field before him. *There*, are many Algæ to be found in a live state on the rocks and in the pools of the rocks; but he will find that the little creek or harbour acts as a decoy to wile within his reach many of the precious floating wanderers of the deep; and that by every tide it is replenished with fresh variety, amidst which he may luxuriate and pick and choose at will.

I do not mean at present to luxuriate on Algæ, nor even to attempt to enumerate the various species that, in their season, may be there found. I shall limit my few remarks to one which, though considered rare, is met with during summer in considerable abundance amongst the rejectamenta in the little creek: I mean the beautiful little *Polysiphonia parasitica*. I have fixed on *it*, because I have observed on it a kind of fructification which I think has hitherto been unnoticed. I am quite aware that I am on dangerous ground; that a person with few scientific books, and scarcely any leisure to read those he has, in proclaiming discoveries, is in very great danger of treading on a touchy toe, or of stealing some person's thunder. Now, if this should be my unfortunate case, I can only respectfully say, "Pardonnez-moi, I really did not intend it." However, I am at all events entitled to say that the fruit of *Polysiphonia parasitica* is rare, when so distinguished a botanist as Mr. Harvey says he has never seen the capsules. A few days ago my youngsters, who have more leisure than I have, brought me specimens from Portincross with three kinds of fructification! Two kinds they had detected with the naked eye, but the third, and as I think *new* kind, I detected on using a lens. The fine large dark-coloured capsules (Pl. IV. fig. 1) were very conspicuous, being large in proportion to the size of the plant. On a distinct plant from that which bore the capsules, the second kind of fructification was very visible, viz. large reddish brown granules imbedded not only in the ultimate ramuli, giving them a knotted as well as spotted appearance, but also imbedded in single longitudinal rows in several of the branches (fig. 2 *a*). The kind which I detected on the same plant which had the granular fructification consisted of capsules also, but of quite a different form from the large dark brown capsules, and resembling the capsules of *Rhodomela subfusca*, or of *R. lycopodioides*, or rather something intermediate between these two (fig. 2 *b*). They seem nearly of the same colour and substance as the branches on which they are placed, whereas the other capsules are different from the branches both in colour and texture. It is this sameness of substance and colour with the branches which makes them less easily detected, for they are of sufficient size to be seen on close examination even with the naked eye. I

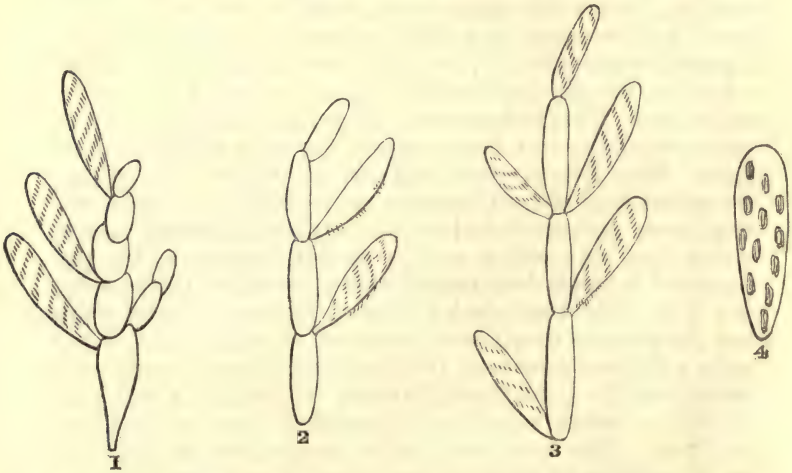
might have been led to conjecture that they were only the common capsules in an immature state, had they not been on the plants that bore granular fruit, and had I not found it stated in Harvey's 'Manual,' that the two kinds of fructification, capsules and granules, are on distinct plants. It is fair to state however that I have observed two granules, and only two, in one of the ramuli of a plant with the large dark-coloured capsules, so that it may turn out that where the granules abound the capsules are dwarfed, and that where there are scarcely any granules in the branches and ramuli, there the capsules swell and are perfected.

I must now conclude my lengthy note. I am glad of anything that attracts attention to this beautiful little *Polysiphonia*.

Rockvale, Saltcoats, June 1844.

XXI.—*Note on the Fructification of* Cutleria. By G. Dickie, M.D., Lecturer on Botany in the University and King's College of Aberdeen*.

The results of observations which have already been communicated to the Society on the fructification of the Algæ found in this vicinity, led to an examination of other genera not growing here, but of which I possess dried specimens; and at present reference is specially made to *Cutleria multifida*, Grev. In Harvey's



'Manual,' Dr. Greville's account of the fructification is quoted, viz. "minute tufts of capsules scattered on both sides of the frond; the capsules pedicellate, containing several distinct granules." I

* Read before the Botanical Society of Edinburgh, April 11th, 1844.

have in vain searched for such a structure as is represented in the 'Algæ Britannicæ'; from a careful examination it appears that the fructification of this species is essentially the same as that which has been called acrospermal. It was remarked in a former communication that *Asperococcus* presents the basisperms and their accompanying simple filaments completely exposed; so of *Cutleria* it may be probably legitimate to say, that its fructification represents the acrospermal arrangement of a Fucus also placed on the surface, without any inflexion of the frond to form conceptacles. The accompanying figures represent the structure of the fruit in the genus alluded to. In this genus the asci and sporidia are exceedingly delicate and transparent: figs. 1, 2, 3 represent both; fig. 4, one of the latter separated.

XXII.—*On Microscopic Life in the Ocean at the South Pole, and at considerable depths.* By Prof. Ehrenberg*.

The following is the substance of a paper laid by Prof. Ehrenberg, May 23rd, 1844, before the Berlin Academy, and containing some of the results derived from his recent investigations upon materials furnished from the South Polar expedition of Captain Ross and the voyages of Messrs. Darwin and Schayer; their object being to determine the relation of minute organic life in the ocean, and at the greatest depths hitherto accessible.

Last year the author submitted to the Academy a survey of the geographical distribution of such organisms over the entire crust of the earth; but the field of these inquiries being one of such vast extent and importance, it became evident to him, that to arrive at any positive general results, it was necessary to examine the subject under a more special point of view, and under this conviction, two different courses of investigation suggested themselves as best adapted to fulfill that purpose; viz. first, to ascertain both the constant and periodical proportion which minute organisms bear to the surface of the ocean in different latitudes; and secondly, to examine submarine soil or sea-bottom raised from the greatest possible depths. It is an easy matter, generally, to collect materials of this kind; but before applying to them the test of philosophic criticism and research, the author feels that it is essentially requisite to retrace the contributions of other writers upon the same subject; premising, however, that their value will always be enhanced in so far as the materials collected have been obtained with due care and reference to their several localities.

* From the Proceedings of the Berlin Academy for May, and communicated by the Author.

I. *The South Polar Voyage from* 1841 *to* 1843.

Very essential progress was made in our knowledge of the minute and invisible forms of organic life during the years devoted to this expedition by Captain Ross. In the year 1840, the Royal Society of London appointed a committee to prepare a series of physical and meteorological questions to be solved by the proposed expedition; and it was at the express desire of the author that Alex. v. Humboldt undertook to suggest to that body the importance of attention being paid to the study of the relations under which minute organisms exist, as one likely to throw considerable light upon the principal questions now agitated, involved in the recent history of the earth's crust, and also to recommend that the directions given by the author as to the methods of collecting them should be adopted throughout the whole voyage. Through the scientific ardour of Dr. J. Hooker, son of the well-known botanist and a voyager on board the ship Erebus, a variety of valuable materials were collected during the expedition, and a short time back about forty packages and three glasses of water were transmitted to Germany from the neighbourhood of Cape Horn and Victoria Land. About the same time also, Mr. Darwin, the profound observer upon the formation of coral reefs in the South-seas, contributed objects from other localities.

The author set about examining carefully without delay, as such an opportunity might not again recur, water which had been taken from the South Polar sea of from 75° to 78° 10′ south latitude, and 162° west longitude, with a view of determining its relative amount of minute organic life. Of the dry materials some packets only have as yet been examined, those namely which from their localities appear to possess the greatest interest, and among these were specimens of the remains of melted polar ice and sea-bottom, taken under south latitudes 63° and 78°, from depths of 190 to 270 fathoms (*i. e.* 1140—1620 feet), the greatest depths that have been hitherto sounded.

The relations of minute organic life were found, as the author had anticipated, to be the same at the south as at the north pole, and generally of great extent and intensity at the greatest depths of the ocean.

Previous observations upon those loftiest mountains whose pinnacles are capped with eternal ice, had determined that a gradual progressive disappearance of organic life takes place from the base to their summit, and that too in accordance with particular laws; to the tree succeeding the lowly shrub, next grass and lichens, till finally we arrive at the regions of perpetual snow, where there is a complete absence of all life. In like manner the development of organized beings has been conceived to diminish from the equator to the arctic regions of the earth, the latter becoming first

destitute of trees, then of grass, lastly of lichens and algæ, until at the poles ice and death hold solemn reign.

The greatest depths in the ocean at which Mollusca had been found to exist were, according to the observations of Mr. Cuming in the year 1834, the genera *Venus, Cytherea* and *Venericardia* at 50, *Byssoarca* at 75, and *Terebratula* in 90 fathom water. According to Milne-Edwards and Elie de Beaumont, 244 metres, or 732 foot, formed the extreme range for the growth of corals and the development of organic matter in the sea off the coast of Barbary. From a 100-fathom depth, Péron drew up in the year 1800, off New Holland, *Sertulariæ* and a variety of corallines, which were all luminous, and on an average three degrees higher in temperature than the surface of the sea. In 1824 and 1825 Quoy and Gaimard, in their valuable researches upon the structure of corals, asserted that branched corallines could occur only in a depth of from 40 to 50 fathom, and that in a 100 fathom of water *Retepora* alone existed. According to Ellis and Mylius, who wrote in 1753, the greatest known depth from which a living animal had been taken was the *Umbellaria Encrinus,* which was fished up by Captain Adrian in Greenland from 236 fathom of water, equal to a depth of 1416 foot. Specimens, however, of the sea-bottom have been drawn up from still greater depths; for at Gibraltar, Captain Smith found in 950 fathom, or 5700 foot of water, sand containing fragments of shells; and Captain Vidal, according to Mr. Lyell, detected in the mud of Galway Firth, from a depth of 240 fathom, only some *Dentalia,* the remainder of the sea-bottom from the same depth consisting of pulverized shells and other organic remains devoid of life.

According to the calculations of Parrot, a column of sea-water at a depth of 1500 foot exercises a pressure of 750 pound, or $7\frac{1}{2}$ hundredweight, upon the square inch; and since the atmospheric air inclosed in these animals of a delicate cellular structure descending from the surface of the ocean would produce alternately such extremes of expansion and contraction as to appear destructive to such organisms, just doubts have been raised whether organic life could actually subsist at great depths.

Wollaston, moreover, in 1840 proved that at the great depth of 670 fathom, in the Mediterranean Sea off Gibraltar, the proportion of salt in the water was four times greater than at the surface. Very accurate and scientific investigations upon the amount of salts of the sea had been already published by Lenz in Petersburg during 1830; and Mr. Lyell, in his 'Geology' of 1840, was induced to regard the observations of Wollaston not as simply indicating a local phænomenon, but to conclude that at still greater depths the relative proportion of saline matter would be still more remarkable, and must progress in a similar advancing ratio.

Lastly, Elie de Beaumont, in 1841, adopted the opinion, that the limits to which the waters of the sea had been found by Siau capable of being set in motion, must be also those at which sessile marine animals could exist, since these have to wait for their food, which in this way only could be conveyed to them, and that consequently the limits of stationary organic life, taken in conjunction with the depth of the waves, could not much exceed 200 metres or 600 foot.

Such considerations, deeply affecting the general science of geology, and to which must be added observations upon the increase of temperature towards the centre of the earth, have ever suggested as an interesting matter for inquiry to the author, to examine minute organic life in relation to the depth of the element in which it could exist.

Science indeed owes a great debt of gratitude to those travellers who have so industriously provided the materials of this investigation; in respect of which materials it may be observed generally, that they are very rich in quite new typical forms, particularly in genera, of which some contain several species; these, occasionally with some mud and fragments of small crustaceans, form the chief part of the mass. The new genera* and species are here recorded, and of these the *Asteromphali* are very remarkable, from their particularly beautiful stellate forms.

Analysis of the various materials furnished by Dr. Hooker from the South Polar Voyage.

1. Residue from some melted Pancake Ice† at the barrier in 78° 10′ S. lat., 162° W. long.

A. SILICEOUS POLYGASTRICA.

1. *Actinoptychus biternarius.*
2. Asteromphalus *Hookerii.*
3. — *Rossii.*
4. — *Buchii.*
5. — *Beaumontii.*
6. — *Humboldtii.*
7. — *Cuvierii.*
8. *Coscinodiscus actinochilus.*
9. — *Apollinis.*
10. — *cingulatus.*
11. — eccentricus.
12. — *gemmifer.*
13. — limbatus.
14. — lineatus.
15. *Coscinodiscus Lunæ.*
16. — Oculus Iridis.
17. — radiolatus.
18. — subtilis.
19. — velatus.
20. *Dicladia antennata.*
21. — *bulbosa.*
22. *Dictyocha* aculeata.
23. — Binoculus.
24. — *biternaria.*
25. — Epiodon.
26. — *octonaria.*
27. — Ornamentum.
28. — septenaria.

* Of the 7 new genera of Polygastrica, viz. *Anaulus, Asteromphalus, Chætoceros, Halionyx, Hemiaulus, Hemizoster,* and *Triaulacias,* short characters are given in the Proceedings of the Academy: also of the 71 new species.

† Thin and level fragments of ice found floating in the ocean.

29. *Dictyocha* Speculum.
30. *Flustrella* concentrica.
31. *Fragilaria* acuta.
32. — Amphiceros.
33. *Gallionella pileata.*
34. — sulcata?
35. Halionyx *senarius.*
36. — *duodenarius.*
37. Hemiaulus *antarcticus.*
38. Hemizoster *tubulosus.*
39. *Lithobotrys denticulata.*
40. *Lithocampe australis.*
41. *Pyxidicula dentata.*
42. — hellenica.
43. *Rhizosolenia Calyptra.*
44. — *Ornithoglossa.*
45. *Symbolophora Microtrias.*
46. — *Tetras.*
47. — *Pentas.*
48. — *Hexas.*
49. *Synedra* Ulna?
50. *Triceratium Pileolus.*
51. *Zygoceros australis.*

B. SILICEOUS PHYTOLITHARIA.

52. *Amphidiscus* Agaricus.
53. — clavatus.
54. — *Helvella.*
55. *Lithasteriscus bulbosus.*
56. *Spongolithis* acicularis.
57. — aspera.
58. — *brachiata.*
59. — Caput serpentis.
60. — cenocephala.
61. — Clavus.
62. — collaris.
63. — Fustis.
64. *Spongolithis Heteroconus.*
65. — inflexa.
66. — *Leptostauron.*
67. — mesogongyla.
68. — neptunia.
69. — *radiata.*
70. — trachelotyla.
71. — *Trachystauron.*
72. — *Trianchora.*
73. — *vaginata.*
74. — verticillata.
75. — uncinata.

C. CALCAREOUS POLYTHALAMIA.

76. *Grammostomum divergens.*
77. *Rotalia antarctica.*
78. *Rotalia Erebi.*
79. *Spiroloculina* —?

In several forms of the genus *Coscinodiscus* their green ovaries were recognizable, consequently they must have been alive.

2. Residue from melted ice, while the ship sailed through a broad tract of brown pancake ice, in 74° to 78° south latitude. (Materials from 75° S. lat., 170° W. long.)

A. SILICEOUS POLYGASTRICA.

1. Asteromphalus *Buchii.*
2. — *Rossii.*
3. *Coscinodiscus* lineatus.
4. — *Lunæ.*
5. — Oculus Iridis.
6. — radiolatus.
7. — subtilis.
8. *Dictyocha* aculeata.
9. *Eunotia* gibberula.
10. *Fragilaria* acuta.
11. — *pinnulata.*
12. — rotundata.
13. Hemiaulus *antarcticus.*
14. Hemizoster *tubulosus.*

B. SILICEOUS PHYTOLITHARIA.

15. *Spongolithis Fustis?* Fragm.

These and the former specimens were sent over in bottles of water. They were the same sealed bottles in which they were collected in the year 1842. In the first little bottle, in which the sediment was considerable, almost every atom being a distinct sili-

ceous organism, *Hemiaulus antarcticus* predominated. The larger bottle of the second mass had allowed the greater part to leak through the sealed cork, so that only about a quarter remained. The mass of sediment arrived in Berlin in May 1844, almost all in such a condition, that the author had no hesitation in considering them still alive, although they all belonged to the almost or perfectly motionless forms. The Fragilarias predominated (*F. pinnulata*); these, though rarely adherent in chains, had their green ovaries mostly preserved in a distinct natural disposition: *Coscinodisci* and *Hemiaulus* also often exhibited groups of green granules in their interior. No movement.

The following numbers were sent over dried:—

3. Sea-bottom drawn up by the lead from 190 fathom depth, in 78° 10′ S. lat., 162° W. long.

A. SILICEOUS POLYGASTRICA.

1. Asteromphalus *Hookerii.*
2. — *Buchii.*
3. — *Humboldtii.*
4. — *Cuvierii.*
5. *Coscinodiscus Apollinis.*
6. — *gemmifer.*
7. — limbatus.
8. — lineatus.
9. — *Lunæ.*
10. — radiolatus.
11. *Dictyocha septenaria.*
12. — Speculum.
13. *Fragilaria* Amphiceros.
14. *Fragilaria* al. sp.
15. *Gallionella Sol.*
16. Hemiaulus *antarcticus.*
17. *Lithobotrys denticulata.*
18. *Mesocena Spongolithis.*
19. *Pyxidicula.*
20. *Rhizosolenia Ornithoglossa.*
21. *Symbolophora? Microtrias.*
22. — *Tetras.*
23. — *Pentas.*
24. — *Hexas.*
25. Triaulacias *triquetra.*
26. *Triceratium Pileolus.*

B. SILICEOUS PHYTOLITHARIA.

27. *Amphidiscus Polydiscus.*
28. *Spongolithis* acicularis.
29. — aspera.
30. — *brachiata.*
31. — Caput serpentis.
32. — cenocephala.
33. — *Clavus.*
34. *Spongolithis* Fustis.
35. — neptunia.
36. — *Pes Mantidis.*
37. — *Trianchora.*
38. — *vaginata.*
39. — uncinata.

4. From snow and ice taken from the sea in 76° S. lat., 165° W. long., near Victoria Land.

SILICEOUS POLYGASTRICA.

1. *Coscinodiscus* lineatus.
2. — *Lunæ.*
3. — subtilis.
4. *Fragilaria pinnulata.*
5. — rotundata.
6. — al. sp.

The chief mass was densely crowded with *Fragilaria pinnulata* and with *Coscinodiscus*, which on softening in water generally exhibited their green ovaries, perhaps originally brown.

5. Contents of the stomach of a Salpa, 66° S. lat., 157° W. long. 1842.

SILICEOUS POLYGASTRICA.

1. *Actiniscus Lancearius.*
2. *Coscinodiscus Apollinis.*
3. — *cingulatus.*
4. — *gemmifer.*
5. — lineatus.
6. — *Lunæ.*
7. — subtilis.
8. *Dictyocha* aculeata.
9. — Speculum.
10. *Fragilaria* acuta.
11. — *granulata.*
12. — rotundata.
13. Halionyx *duodenarias.*
14. *Pyxidicula.*

This material contained a large number of *Dictyochas*, which evidently must have been particularly sought for by the Salpa, since they do not occur in the other samples, and consequently appear to be a favourite food of the Salpa.

6. Flakes floating on the surface of the ocean in 64° S. lat., 160° W. long.

They are like the *Oscillatoriæ* of our waters, matted with delicate fibres and with granules interspersed through the mass. The chief substance is formed of siliceous, very delicate, lateral tubes of the quite new and peculiar genus *Chætoceros*. The nature of the granules remains doubtful. The other forms are scattered through this matted substance; all exhibit however their dried-up ovaries, and consequently were collected alive.

SILICEOUS POLYGASTRICA.

1. Asteromphalus *Darwinii.*
2. — *Hookerii.*
3. — *Rossii.*
4. — *Buchii.*
5. — *Humboldtii.*
6. Chætoceros *Dichæta.*
7. — *Tetrachæta.*
8. *Coscinodiscus* lineatus.
9. — subtilis.
10. *Dictyocha* aculeata.
11. — Binoculus.
12. — Ornamentum.
13. — Speculum.
14. *Fragilaria* Amphiceros.
15. — *granulata.*
16. Hemiaulus *obtusus.*
17. *Lithobotrys denticulata.*

7. The mass brought up by the lead from the bottom of the sea in the Gulf of Erebus and Terror, at the depth of 207 fathoms, in 63° 40′ S. lat., 55° W. long.

The following species, occasionally with distinct green ovaries, were found in this very small sample, mixed among the apparently unorganic sand.

A. SILICEOUS POLYGASTRICA.

1. Anaulus *scalaris.*
2. *Biddulphia ursina.*
3. *Coscinodiscus Apollinis.*
4. — *cingulatus.*
5. *Coscinodiscus Lunæ.*
6. — subtilis.
7. — velatus.
8. *Fragilaria* rotundata.

9. *Gallionella Sol.*
10. — *Tympanum.*
11. *Grammatophora* parallela.
12. Hemiaulus *antarcticus.*
13. *Rhaphoneïs fasciolata.*
14. *Zygoceros*? *australis.*

B. SILICEOUS PHYTOLITHARIA.

15. *Spongolithis* acicularis.
16. *Spongolithis* Fustis.

8. Sea-bottom drawn up by the lead from 270 fathom, in 63° 40′ S. lat., 55° W. long.

A. SILICEOUS POLYGASTRICA.

1. *Achnanthes* turgens.
2. *Amphora* libyca.
3. Anaulus *scalaris.*
4. *Biddulphia ursina.*
5. *Campylodiscus* Clypeus.
6. *Coscinodiscus Apollinis.*
7. — *gemmifer.*
8. — lineatus.
9. — *Lunæ.*
10. — Oculus Iridis.
11. — radiolatus.
12. — subtilis.
13. *Denticella lævis.*
14. *Discoplea Rota.*
15. — *Rotula.*
16. *Flustrella* concentrica.
17. *Fragilaria* Amphiceros.
18. — *pinnulata.*
19. *Gallionella Oculus.*
20. — *Sol.*
21. *Gallionella* sulcata.
22. *Grammatophora* africana.
23. — parallela.
24. — *serpentina.*
25. Hemiaulus *antarcticus.*
26. *Lithocampe* n. sp.
27. *Mesocena Spongolithis.*
28. *Navicula elliptica.*
29. *Podosphenia* cuneata.
30. *Pyxidicula* hellenica?
31. *Rhaphoneïs fasciolata.*
32. *Rhizosolenia Calyptra.*
33. — *Ornithoglossa.*
34. *Stauroptera* aspera.
35. *Symbolophora Microtrias.*
36. — *Tetras.*
37. — *Pentas.*
38. — *Hexas.*
39. *Synedra* Ulna.

B. SILICEOUS PHYTOLITHARIA.

40. *Amphidiscus* clavatus.
41. *Spongolithis* acicularis.
42. — aspera.
43. — *brachiata.*
44. — Caput serpentis.
45. — Clavus.
46. — Fustis.
47. *Spongolithis Heteroconus.*
48. — *ingens.*
49. — neptunia.
50. — obtusa.
51. — *vaginata.*
52. — uncinata.

C. CALCAREOUS POLYTHALAMIA.

53. *Grammostomum divergens.*

9. Samples from Cockburn's Island, the furthest limit of vegetation at the South Pole, 64° 12′ S. lat., 57° W. long.

Off Cockburn's Island (Cockburn's Head) Dr. Hooker saw an Alga, as the lowest and furthest step of vegetation, with forms of *Protococcus.* The Alga is one of the *Tetraspora* allied to *Ulva,* which Dr. Hooker has reserved in order to describe more accurately: I have not recognised the *Protococcus* in its dried condition. This mass, however, is chiefly and equally peopled with and made up of Siliceous Polygastrica. An apparently unorganic

sand, penguins' feathers and excrements, the *Ulva*, and only five as yet distinguished species of siliceous Infusoria in great numbers, form the mass sent over. The vegetable substances may indeed have disappeared by putrefaction. The excrement of the birds, like guano, might abundantly furnish solid matter; but the solid siliceous earthy element of the little invisible polygastric animals appears to form no inconsiderable part of the solid substance, which by the death of generations goes to form earth and land.

The following forms were observed:—

SILICEOUS POLYGASTRICA.

1. *Eunotia* amphioxys.
2. *Pinnularia* borealis.
3. — peregrina?
4. *Rhaphoneïs Scutellum.*
5. *Stauroptera capitata.*

Two forms are new, two have been observed also at the north pole, and one is widely distributed.

II. *Oceanic materials from M. Schayer.*

M. Schayer of Berlin, who for fifteen years was superintendent of English sheep-folds at Woolnorth in Van Diemen's Land, has, in answer to a request sent to him in the year 1842 by the author, collected materials unquestionably rich in microscopic animals; he also collected water taken from the ocean in different regions on his return in 1843, and brought with him to Berlin four bottles holding from a quarter to half a pint. The author had wished that water had been drawn up at a distance from the coast in accurately known places, in order to become acquainted in some measure with the usual amount of microscopic life of the ocean.

The four well-preserved sealed bottles which have arrived in Berlin were shown to the Academy by the author, and the water is still quite clear and transparent, having only a few flakes at the bottom, which render it turbid when shaken, but soon subside again to the bottom, and the former transparency is restored. When opened, a slight but yet evident trace of sulphuretted hydrogen was perceptible.

The microscopic investigation has given the following results:

1. Water from the south of Cape Horn on the high sea under 57° S. lat., 70° W. long., contained—

SILICEOUS POLYGASTRICA.

1. *Fragilaria granulata.*
2. Hemiaulus *obtusus.*
3. *Lithostylidium* Serra.

2. Water from the region of the Brazilian coast near Rio de Janeiro on the high sea, in 23° S. lat., 28° W. long.

A. SILICEOUS POLYGASTRICA.

1. *Cocconeïs* Scutellum.
2. *Fragilaria* Navicula.
3. *Gallionella* sulcata.
4. *Haliomma* radiatum.
5. *Navicula* dirhynchus.
6. *Navicula* Scalprum.
7. *Pinnularia oceanica.*
8. — peregrina.
9. *Surirella* sigmoidea.
10. *Synedra* Ulna.

B. SILICEOUS PHYTOLITHARIA.

11. *Spongolithis* aspera.
12. — cenocephala.
13. *Spongolithis* Fustis.
14. — *vaginata.*

3. Water from the equatorial ocean in the direction of St. Louis in Brazil, in 0° lat., 28° W. long.

A. SILICEOUS POLYGASTRICA.

1. *Fragilaria* rhabdosoma.
2. *Fragilaria* Navicula.

B. SILICEOUS PHYTOLITHARIA.

3. *Lithostylidium* rude.
4. *Lithostylidium* Serra.

4. Water from the Antilles Ocean, 24° N. lat., 40° W. long.

A. SILICEOUS POLYGASTRICA.

1. *Haliomma* radiatum.

B. SILICEOUS PHYTOLITHARIA.

2. *Lithodontium* nasutum.
3. *Lithostylidium* Amphiodon.
4. *Lithostylidium* rude.

C. MEMBRANOUS PORTIONS OF PLANTS.

5. *Pollen* Pini.

It follows from these four series of observations obtained through M. Schayer, that the ocean, in its usual condition, without peculiarity of colour, without storms and other influences, contains, in the most transparent sea-water, numerous perfect and wholly invisible organisms suspended in it, and that the siliceous-shelled species are the most predominant in all those cases, although the analysis of sea-water does not show silica as a constant ingredient.

III. *On a Cloud of Dust which rendered the whole air hazy for a long time on the high Atlantic Ocean in* 17° 43′ *N. lat.,* 26° *W. long., and its being constituted of numerous siliceous animalcules.*

Mr. Darwin, the well-known and most meritorious English traveller and writer on coral reefs, relates in the account of his travels, that a fine dust constantly fell from the hazy atmo-

sphere off the Cape Verd Islands, and also on the high sea of that region, while he was there; and likewise on a ship, which, according to the account in his letter, was 380 sea-miles distant from land. The wind was then blowing from the African coast. Mr. Darwin has sent to the author for examination a sample of the dust which fell on the ship on the high sea at that great distance from land. This dust has been universally regarded hitherto as volcanic ashes. The microscopic analysis has clearly shown that a considerable portion, perhaps one-sixth of the mass, consists of numerous species of Siliceous Polygastrica and portions of silicated terrestrial plants, as follows :—

A. SILICEOUS POLYGASTRICA.

1. *Campylodiscus* Clypeus.
2. *Eunotia* Amphioxys.
3. — gibberula.
4. *Gallionella* crenata.
5. — distans.
6. — granulata.
7. — marchica.
8. — procera.
9. *Gomphonema* rotundatum ?
10. *Himantidium* Arcus.
11. — Papilio.
12. *Navicula* affinis ?
13. — lineolata.
14. — Semen.
15. *Pinnularia* borealis.
16. — gibba.
17. *Surirella* (peruviana ?).
18. *Synedra* Ulna.

B. SILICEOUS PHYTOLITHARIA.

19. *Amphidiscus* Clavus.
20. *Lithodontium* Bursa.
21. — curvatum.
22. — furcatum.
23. — nasutum.
24. — truncatum.
25. *Lithostylidium* Amphiodon.
26. — *clavatum.*
27. — cornutum.
28. — læve.
29. *Lithostylidium* Ossiculum.
30. — quadratum.
31. — rude.
32. — Serra.
33. — *spiriferum.*
34. *Spongolithis* acicularis.
35. — aspera.
36. — mesogongyla.
37. — obtusa.

The forms included in this catalogue, mostly known and for the most part European, prove—

1. That this meteoric shower of dust was of terrestrial origin.

2. That it was not volcanic ash.

3. That it was dust which had been lifted up to a great height from a dried-up marshy district by an unusually strong current of air or a whirlwind.

4. That the dust did not necessarily and evidently come from Africa, as being the nearest land, although the wind blew from thence when the dust fell; for this reason, that no exclusively African forms are among it.

5. That as *Himantidium Papilio,* a very marked form, has hitherto occurred only in Cayenne (see the Mikroskopische Leben in Süd- und Nord-Amerika, plate 2. fig. 2.), and as the *Surirella* is also probably an American form, only two conclusions present themselves; either that the dust was raised in South America into

the upper strata of air, and brought by a change of the current in another direction, or *Himantidium Papilio*, together with *Surirella*, likewise occur elsewhere, namely in Africa.

Review of the Results of these Investigations.

1. Not only is there, as resulted from the former observations of the author (vide d. Mikroskopische Leben in Amerika, Spitzbergen, &c.), an invisible minute creation in the neighbourhood of the Pole, where the larger animals can no longer subsist, but a similar creation is highly developed at the South Pole.

2. Even the ice and snow of the South Polar Sea is rich in living organisms, contending successfully with the extremity of cold.

3. The microscopic living forms of the South Polar Sea contain great riches hitherto wholly unknown, frequently of very elegant shape, since no less than seven peculiar genera have been discovered, of which some contain several, one as many as seven species.

4. The forms collected in the year 1842, near Victoria Land, were capable of being examined in an almost fresh state in Berlin in May 1844, which shows how long preservation is possible.

5. The ocean is not only populated at certain localities, and in inland seas or on the coasts, with invisible living atoms, but is proportionately thickly crowded with life everywhere in the clearest state of the sea-water and far from the coasts.

6. Hitherto but one perfectly microscopic form from the high sea was known, and even that from the neighbourhood of the coast, namely the *Astasia oceanica*, which Von Chamisso had observed; all other accounts were imperfect and useless. By the new materials the number of species is increased nearly 100.

7. The hitherto observed oceanic microscopic forms are chiefly siliceous-loricated animals with some calcareous-shelled. Do these numerous forms derive the material of their shells from the bottom of the sea? This question becomes daily more interesting.

8. Siliceous- and calcareous-shelled minute living forms are not only mixed up with the muddy sea-bottom, but they themselves form it. They live even to a depth of 270 fathom, and consequently support a pressure of water equal to 50 atmospheres; the whole influence of this does not indeed bear upon their organic tissues when they are locally fixed, but when they move from the bottom upwards or reversely; yet it does not appear to have acted on the drawn up specimens. Who can doubt but that organic beings which can support a weight of 50 atmospheres may support 100 and more?

9. The supposition, that in great depths, above 100 fathom,

there is no fresh nutriment for organized beings of any kind, has become untenable.

10. Life and temperature in the depths of the ocean are, in their variable relation, the points which at present deserve especial attention.

11. The showers of meteoric dust, or supposed ashes, have at present been proved to be, even in the case where they fell 380 sea-miles from land, of organic and terrestrial origin.

12. It is not perishable *Protococci* or *Ulvæ* or Lichens that principally constitutes the organic covering and soil of the ultimate islands in the Polar Sea; but the living creatures that form the first layer of solid earth are invisible, minute, free animals of the genera *Pinnularia, Eunotia* and *Stauroneïs* with their siliceous loricæ. Several species from the North Pole and the South Pole are identical.

XXIII.—*Descriptions of some British* Chalcidites. By Francis Walker, Esq., F.L.S.

Callimome Rasaces, Fem. *Cupreus purpureo varius, metathorace viridi, abdomine cyaneo basi rufo, antennis nigris, pedibus fulvis, alis subfuscis.* (Corp. long. lin. 2; alar. lin. 3.)

Body convex: head and thorax cupreous, tinged with purple, covered with minute scales disposed in little transverse striæ: head short, transverse, a little broader than the thorax: antennæ subclavate, black, as long as the thorax; first joint fulvous, long, stout, linear, black towards the tip; second cyathiform; third and fourth very minute; fifth and following joints to the club successively decreasing in length; club long-conical, acuminate, much more than twice the length of the eleventh joint: thorax elliptical, punctured sparingly and irregularly: prothorax large, subquadrate; its breadth exceeding its length; rounded on each side in front: scutum of the mesothorax large, its breadth slightly exceeding its length; sutures of the parapsides distinct, approaching each other; axillæ large, triangular, not conniving; scutellum nearly rhomboidal, of moderate size, abruptly decumbent behind: metathorax including the propodeon short, transverse, rugulose, mostly green: podeon extremely short: abdomen elliptical, subcompressed, smooth, dark blue varied with purple, as long as the thorax; metapodeon pale red, occupying rather more than one-fourth of the dorsum; octoon much shorter than the metapodeon; ennaton much longer? than the octoon; decaton as long? as the octoon; protelum, paratelum and telum short: oviduct a little longer than the abdomen: legs stout, fulvous: wings slightly fuscous; nervures piceous; humerus less than half the length of the wing; ulna more than half the length of the humerus; radius about one-fourth of the length of the ulna; cubitus extremely short, not so long as the radius; stigma of moderate size, emitting a short stout branch that points towards the tip of the radius.

Callimome Ærope, Mas. *Viridis, abdomine æneo, basi cupreo-viridi, antennis fulvo-fuscis, pedibus fulvis, femoribus basi fuscis, tarsis basi flavis, alis limpidis.*

Male.—Body convex: head and thorax brilliant green, covered with very minute scales so disposed as partly to form little transverse undulations: head a little broader than the thorax: antennæ clavate, fuscous above, fulvous beneath, as long as the thorax; first joint long, linear; second long-cyathiform; third and fourth very minute; fifth and following joints to the eleventh successively shorter and broader; club long-conical, more than twice the length of the eleventh joint: thorax oval: prothorax large, slightly narrower in front, its length much more than half its breadth: scutum of the mesothorax rather long; sutures of the parapsides very distinct, slightly curved, approaching each other; axillæ large, triangular, not conniving; scutellum rhomboidal: metathorax transverse, shining, decumbent: podeon extremely short: abdomen æneous, nearly linear, smooth, shining, slightly concave along the disc, covered excepting the metapodeon with very minute scales, shorter and narrower than the thorax; metapodeon bright green varied with cupreous, occupying more than one-third of the dorsum; octoon short; ennaton a little longer than the octoon; decaton longer than the ennaton; protelum as long as the decaton; paratelum and telum very short: legs fulvous, stout; coxæ green; thighs slightly fuscous towards the base; knees yellow; tarsi yellow at the base, fuscous at the tips: wings limpid, ample; nervures fulvous; humerus much less than half the length of the wing; ulna a little shorter than the humerus; radius hardly so long as one-fourth of the ulna; cubitus not more than half the length of the radius; stigma very small, emitting a little branch. Length of the body $1\frac{1}{2}$ line; expansion of the wings 2 lines.

Found near Windsor, in June.

Pteromalus domesticus (Entomological Magazine, ii. 481), Mas. *Viridis, abdomen cupreum basi viride, antennæ nigræ, pedes nigri, genubus tarsisque albis aut flavis, propedum genubus tarsisque flavis aut fulvis, alis limpidis, nervis pallide fuscis.*

Body convex: head and thorax minutely squameous: head a little broader than the thorax: the middle ocellus very little in advance of the other two: antennæ filiform, stout, longer than the thorax; first joint long, slender; second cyathiform; third and fourth very minute; fifth and following joints to the tenth linear, successively but very slightly decreasing in length; club fusiform, twice the length of the tenth joint: thorax oval: prothorax transverse, very short, just visible above, rounded in front: scutum of the mesothorax short, slightly convex, its breadth much exceeding its length; sutures of the parapsides approaching each other, very indistinct; axillæ large, triangular, not conniving; scutellum subconical, or nearly pentagonal, the three fore-sides being applied to the axillæ and to the margin of the scutum between them; its scales are more minute than those of the scutum: metathorax very short, appearing trans-

versely just behind the scutellum : propodeon transverse, of moderate size, narrower behind, slightly decumbent, having a little ridge along its disc, and a rim on either side: podeon extremely short: abdomen flat, concave, smooth, shining, nearly linear, narrower and much shorter than the thorax; the segments minutely squameous; metapodeon occupying about one-third of the dorsum; octoon, ennaton, decaton and protelum of moderate and nearly equal size; paratelum short; telum very short: legs rather short and stout; the mesotibiæ and metatibiæ have two spines at their tips, the protibiæ only one: wings moderate; humerus much less than half the length of the wing; ulna less than half the length of the humerus; radius as long as the ulna; cubitus very long, a little shorter than the radius, slightly curved; stigma very small, emitting a short branch.

Female.—Head as broad as the thorax : antennæ subclavate, as long as the thorax; first joint slender, very long; second long-cyathiform; third and fourth very minute; fifth and following joints to the thirteenth short, closely joined together, in form like a long spindle which is about equal in length to the four preceding joints; club conical, more than twice the length of the tenth joint: abdomen round, concave, sculptured like that of the male, shorter but not narrower than the thorax; metapodeon occupying more than one-third of the dorsum; octoon and following segments to the protelum of moderate size, successively but slightly decreasing in length; paratelum and telum very short: sternum, coxæ and thighs scaly like the thorax: abdomen slightly keeled; dorsal segments passing underneath, not conniving nor contracted, but leaving a space between them where the ventral segments appear; these latter are equal in number to those of the dorsum, but unlike them successively increase in length from the base to the tip of the abdomen; along the last there is a channel from the base of which the oviduct emerges, but it does not extend beyond the abdomen.

In the month of May the leaves of the apricot-trees in my garden were eaten by multitudes of the larvæ of caterpillars of *Lozotænia Xylosteana*. The moth appeared in the middle of June, and shortly afterwards some of the pupæ disclosed an abundance of *Pteromalus domesticus*. In number the males were to the females in the proportion of two to five. In the following year the moth appeared again, but attacked the pear-trees instead of the apricot-trees. It was not infested by the *Pteromalus*, but I reared two other insects from the pupæ, one belonging to the *Ichneumonidæ*, the other a species of *Tachina*. Like two other species, *Pt. muscarum* and *Pt. tenuis*, the females are found on windows throughout the year; they sometimes appear in great swarms, and are perhaps parasitic on *Tortrix viridana* as well as on the insect mentioned above.

Tetrastichus Rapo (Annals of Natural History, vol. i.). In the month of August many insects of this species emerged from the cocoons of *Microgaster glomeratus*, Linn., that infests the caterpillars of *Pontia Brassicæ*. Thirty-eight specimens or more appeared, and the proportion of males to that of females was as one to four, or thereabouts.

Encyrtus Epona, Mas. *Piceus, subtus flavus, pedibus fulvis, antennis tarsisque piceis, scutello flavo, alis limpidis.* (Corp. long. lin. $\frac{2}{3}$; alar. lin. $1\frac{2}{3}$.)

Body rather long and narrow, nearly flat, finely squameous, thinly clothed with short white hairs, piceous above, yellow beneath: head transverse, short, as broad as the thorax: eyes oval, of moderate size, encircled with yellow: ocelli near together on the vertex: antennæ piceous, filiform, slender, hairy, much longer than the body; first joint fusiform, long, slender, yellow beneath; second cyathiform; third and following joints to the ninth long, linear, successively decreasing in length; club fusiform, not longer than the ninth joint: thorax elliptical: prothorax transverse, narrower in front, larger than is usual in this genus: scutum of the mesothorax broad, forming one segment with the parapsides, yellow on either side; axillæ triangular, very large, almost meeting each other on the dorsum; scutellum yellow, obconical: metathorax with the propodeon and podeon very short: abdomen long-obconical, concave, narrower and a little shorter than the thorax; two or three segments visible on the dorsum: legs fulvous, long, slender, hairy; tarsi piceous; middle legs dilated, and their tibiæ armed with long spines as usual: wings limpid, narrow; nervures piceous; humerus much less than half the length of the wing; ulna about one-fourth of the length of the humerus; radius shorter than the ulna; cubitus shorter than the radius; stigma extremely small.

From the collection of the Rev. G. T. Rudd.

Encyrtus Euryclea, Fem. *Ater, capite cyaneo, antennis piceis flavo cinctis, pedibus flavis nigro cinctis, alis limpidis.* (Corp. long. lin. $\frac{1}{3}$; alar. lin. $\frac{2}{3}$.)

Body black, flat, slightly shining: head blue, transverse, nearly as broad as the thorax: antennæ clavate, a little longer than the thorax; first joint long, piceous, rather stout, yellow at the tip; second joint fuscous, cyathiform; third and following joints to the ninth very small, successively increasing in breadth; third, fourth, fifth and sixth fuscous; seventh, eighth and ninth yellow; club piceous, fusiform, as long as all the joints from the third to the ninth: thorax oval: prothorax transverse, extremely short: scutum of the mesothorax broad, longitudinally rugulose; scutellum somewhat obconical: metathorax with the propodeon and podeon very short: abdomen long-obconical, depressed, narrower but not longer than the thorax: oviduct piceous: legs pale yellow, stout; a broad black band across each thigh and tibia; fore-tarsi fulvous; middle legs dilated and their tibiæ armed with long spines as usual: wings white; nervures yellow; humerus less than half the length of the wing; ulna thick, fulvous, not more than one-fourth of the length of the humerus; radius shorter than the ulna; cubitus as long as the ulna; stigma extremely small.

Found by Mr. Haliday at Holywood, near Belfast in Ireland.

Encyrtus Pyttalus, Fem. *Ater, pedibus piceis, antennis tarsisque fulvis, alis fuscis.* (Corp. long. lin. $\frac{1}{2}$; alar. lin. $\frac{3}{4}$.)

Body black, convex, short, thick, broad, punctured: head trans-

verse, short, very large, roughly punctured, broader than the thorax; front convex: eyes oval, of moderate size: ocelli near together on the vertex: antennæ fulvous, slender, clavate, longer than the thorax; first joint long and slender; second cyathiform; third and following joints to the ninth small, nearly equal in size; club fusiform, much broader than the ninth joint and more than thrice its length: thorax hardly longer than broad: prothorax transverse, short, visible above: scutum of the mesothorax very short, forming one segment with the parapsides; axillæ small, not extending over the dorsum; epimera? large; scutellum obconical: metathorax with the propodeon and podeon very short: abdomen depressed, smooth, shining, shorter than the thorax; its breadth equal to its length: oviduct fuscous: legs piceous, stout; tarsi fulvous; middle legs dilated, and their tibiæ armed with long spines as usual: wings fuscous, small; nervures piceous; humerus less than half the length of the wing; ulna very short, not one-fourth of the length of the humerus; radius as long as the ulna; cubitus longer than the radius; stigma extremely small.

Encyrtus Machæras. Reared by Mr. Haliday from the coccus of the elm.

Encyrtus argentifer. Encyrtus Paralia is a variety of this species.

Aphelinus Acætes, Fem. *Fulvus, antennis piceis, pedibus flavis, alis limpidis.* (Corp. long. lin. $\frac{1}{5}$; alar. lin. $\frac{2}{5}$.)

Body fulvous, flat, slender, shining, finely punctured, yellow beneath: head transverse, nearly as broad as the thorax, slightly produced in front: eyes oval, rather large: ocelli near together on the vertex, the middle one very little in advance of the other two: antennæ subclavate, piceous, longer than the thorax; first joint fulvous, long, rather stout; second yellow, long-cyathiform; third and following joints to the eighth short, successively increasing in breadth; club fusiform, broader than the eighth joint and more than twice its length: thorax oval: prothorax transverse, extremely short, not visible above: scutum of the mesothorax rather large, forming one segment with the parapsides; axillæ triangular, not joining together; scutellum somewhat rhomboidal, shorter than the scutum: metathorax with the propodeon and podeon very short: abdomen long-obconic, longer but not narrower than the thorax: legs yellow; tips of the tibiæ armed with a single spine; joints of the tarsi from the first to the fourth decreasing in length; fifth joint longer than the fourth; ungues and pulvilli small: wings limpid; nervures yellow, not extending beyond the middle of the wing; humerus passing like the ulna along the costa; radius extremely short; cubitus longer than the radius; stigma very small.

From the collection of the Rev. G. T. Rudd.

XXIV.—*Description of a new British species of* Callithamnion.

By W. H. Harvey, Esq., Trinity College, Dublin.

[With a Plate.]

In the year 1840 I received from the Rev. J. H. Pollexfen a *Callithamnion* gathered by him in the Orkney Islands so distinctly characterized, that I had little difficulty in ascertaining it to be new; and, as a just tribute to its excellent discoverer, I named it *C. Pollexfenii*. The MSS. of my 'Manual of British Algæ' had at that time left my hands, but I forwarded a description of the new *Callithamnion* for insertion in its proper place. By some mischance the slip was mislaid and the book published without any notice having been taken of it; but under the MS. name of *C. Pollexfenii* this beautiful plant has since been known to my friends Mrs. Griffiths, Mr. Ralfs and others, and I only delayed describing it till I should have an opportunity of revising the whole of the British *Callithamnia*, a labour which has become necessary from the many *varieties* of acknowledged species which have come to my knowledge since the publication of the 'Manual,' and some of which may perhaps be admitted eventually to the rank of species.

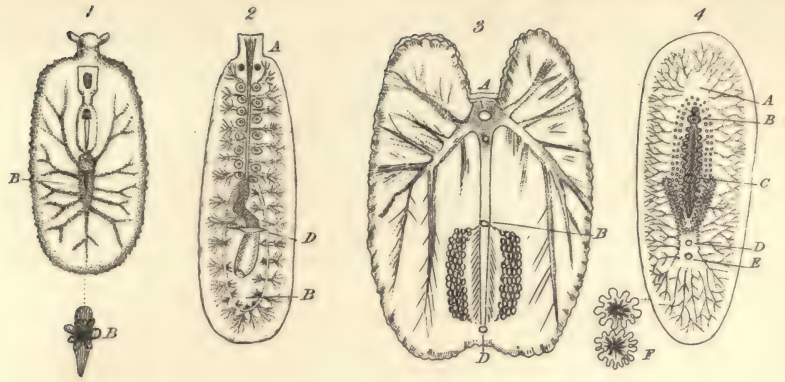
Having lately, however, received a specimen from Dr. Dickie of Aberdeen, which exactly agrees with Mr. Pollexfen's, I no longer delay giving a description of it, as follows:—

Callithamnion Pollexfenii, Harv. Slender, flaccid, *alternately* much branched; branches linear, articulate, each joint having *two* opposite, subulate, slender, short, spine-like, simple ramuli.

On rocks in the sea. Orkney Islands, *Rev. J. H. Pollexfen*, 1840; Aberdeen, *Dr. Dickie*, 1844, April.

Filaments 1—2 inches high, tufted, very slender and flaccid, repeatedly branched in an alternate manner, the major divisions of the frond having a conical or spiry outline. Main stem undivided, one-tubed, jointed and transparent, having several alternate, erecto-patent, rather distant branches, which are again twice, thrice or four times branched in a similar manner, each succeeding series of branches being shorter than the preceding. Every articulation, both of the stem, the branches and the lesser divisions, emits, at a short distance below the joint or diaphragm, a pair of erecto-patent, simple, subulate, short ramuli of much less diameter than the joint from which they spring. Articulations of the branches 4—8 times, of the ramuli once and a half, or twice as long as broad. Colour a fine rosy red. Substance very tender. Fruit unknown. It closely adheres to paper in drying.

At first sight no species appears more isolated, and yet a slight inspection will show that it is closely related to *C. cruciatum*, next



1. *Planaria oceanica.*
2. ..... *macrostoma.*
3. *Planaria incisa.*
4. *Diplanaria notabilis.*

C. Darwin del.ᵉ

Callithamnion Pollexfennii.

W. Harvey del.ᵉ

J. D. C. Sowerby fc.

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to which it may naturally be placed. It differs in being much more branched, in its spiry habit and delicate substance, and, more definitely, in having the opposite ramuli very much shorter and invariably simple and subulate. In the other British species with *opposite* simple ramuli (*C. Turneri*, *Pluma* and *barbatum*) the ramuli do not issue from *every* joint of the frond, nor do they spring from a point *below* that of the diaphragm. These characters are peculiar to *C. Plumula* (a species so different from that under consideration that I need not compare it), to *C. cruciatum* and *C. Pollexfenii*. And in another remarkable peculiarity these latter species also agree, namely, that the ramification proceeds on a plan different from that of the *ramulification*. In most Algæ with decompound fronds, the normal division of the branches is likewise that of the ramuli. In these it is the reverse, the branches being invariably alternate or scattered, and the ramuli as invariably opposite. Here too we never find the ramuli lengthening into branches, and they are nearly of the same size on every part of the frond. And so constantly are they produced by every articulation, that even when a branch is given off, the ramuli of the joint from whose *apex* it springs are as fully developed as those of any simple joint. The ramuli in these species have therefore more affinity with true leaves than with young branches. W. H. H.

July 16, 1844.

EXPLANATION OF PLATE V.

Fig. 5. *Cal. Pollexfenii*, nat. size.
Fig. 6. Portion of a branch, magnified.
Fig. 7. Joints of the stem, to show the insertion of the ramuli, magnified.

XXV.—*On the British* Desmidieæ. By John Ralfs, Esq., M.R.C.S., Penzance*.

[With a Plate.]

Euastrum, *Ehr.*

Frond simple, compressed, deeply divided into two segments which are emarginate at their ends, lobed or sinuated and generally pyramidal.

The fronds are simple, longer than broad, often oblong, compressed, and so deeply constricted that their segments seem only united by a narrow chord. The generally pyramidal segments are broadest at their bases, and are there in such close apposition for their entire breadth as nearly to conceal the notch on each side until the endochrome has collapsed. They are attenuated towards the ends, which in the adult state are always more or less

* Read before the Botanical Society of Edinburgh, April 11, 1844.

emarginate, and their sides are more or less lobed or sinuated. The surface is irregular with inflated prominences, which also form tubercle-like projections along the margins; their number and situation are probably constant in the adult fronds of the same species and different in distinct species. A transverse view, when the two segments are separated, is the best method of ascertaining their number; the terminal lobe has similar prominences.

The species of *Euastrum* are not well defined; plants of this genus vary greatly in form, and it is not unlikely that young fronds have been described as distinct*. Whenever it is practicable the frond should be examined in four different directions; namely, in the front or usual position, at the side, at the end, and by a transverse or junction view after the segments have separated.

In this genus Ehrenberg includes *Micrasterias*, Ag. (not *Micrasterias*, Ehr.) and *Cosmarium*; Meneghini separates the former from it, but includes it in the latter genus. *Euastrum* appears to me to be distinct from both, and especially from *Cosmarium*. It agrees with *Micrasterias* in having lobes and emarginate ends, but the fronds are not incised, nor do the lobes radiate from the centre. From *Cosmarium* it differs in the lobed and emarginate segments, and also in the inflated projections on the surface. These characters will also distinguish it from the other genera in this family.

Starch granules have been detected in nearly all the following species by Mr. Jenner and myself.

I have divided this genus into three sections. *In the first section* the fronds are comparatively large, and appear to the naked eye like roundish or oblong dots. The segments are distinctly lobed; the terminal lobe, cuneate and itself emarginate, is partly included in a notch between the projections of the lateral lobes, and the sinuses which separate it from them are deep and directed inwards and downwards.

In the second section the fronds are more minute and scarcely visible to the naked eye; the segments are less decidedly lobed, but the margin is crenate or sinuated; the terminal portion unites with the basal by a neck-like contraction of the segment, and is therefore never included within a notch; the corners are rounded.

* I have, since I wrote the above, found my opinion confirmed by the following remarks of Meneghini:—"Lobi quoque, pro ætate summopere variant, ideoque in characteribus fixandis, formis perfecte evolutis attendendum. Ex hoc factum est quod species nonnullæ ab auctoribus olim distinctæ nunc temporis evanuere, nec suspicatio excludi potest circa alias quoque species formas summopere similes sistentes."—Meneghini, 'Synopsis Desmidiearum' in Linnæa 1840, p. 218.

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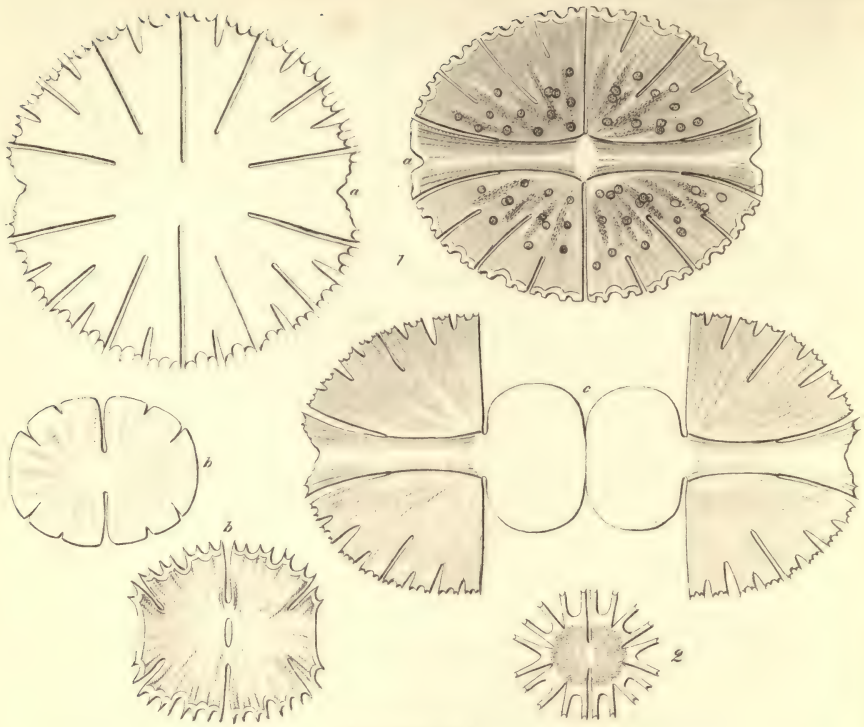
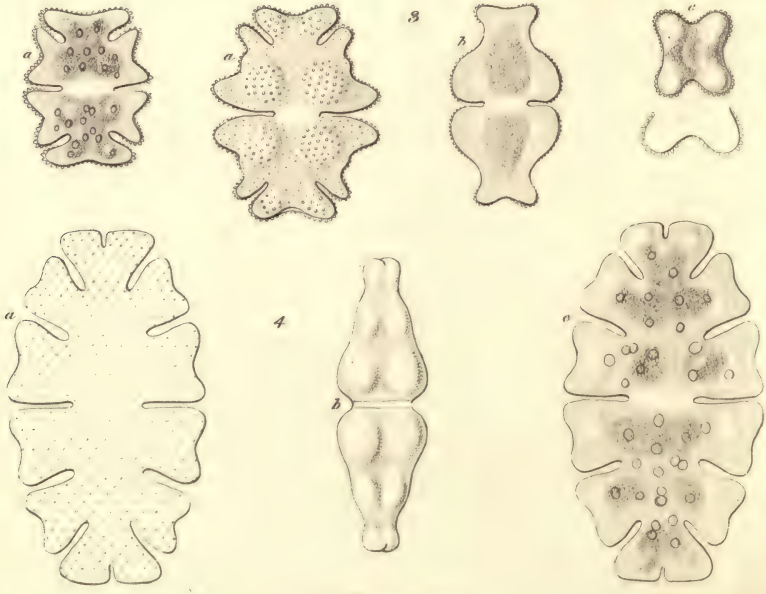


Micrasterias.



Euastrum.

The outline of one of the segments has some resemblance to that of a decanter.

In the third section the fronds are extremely minute, the segments are generally still less lobed than in the last, and the form of the front view is more irregular and differs from that of the preceding sections, especially in having an acute angle or process at either the corners or sides of the terminal portion.

* *Segments of the frond deeply lobed; the terminal lobe cuneate, and partly included in a notch formed by the projection of the ends of the lateral lobes.*

1. *E. verrucosum*, Ehr. Frond rough with conic granules; the segments three-lobed; lobes broad, subcuneate, with a broad shallow notch. Ehr. Infus. p. 162. tab. 12. fig. 5; Pritch. Infus. p. 196. fig. 125. *Cosmarium verrucosum*, Menegh. Synop. Desmid. in Linnæa 1840, p. 222.

Amongst aquatic plants in pools: rare. Cheshunt, *Mr. Hassall*; Weston Bog near Southampton, Rusthall Common, Kent, near Tunbridge Wells, and Ashdown Forest, Sussex, *Mr. Jenner*; Penzance.

Fronds compressed; the segments which slightly diverge from each other are broader than long, deeply three-lobed; the lobes, particularly the terminal one, broad and cuneate, and each has a broad, shallow, terminal notch. Surface of the frond furnished with numerous conic granules which give the margins a dentated appearance: each segment has two prominences near the base; on these the granules form two or three concentric circles with a granule in the centre; the terminal lobe has two similar but smaller prominences.

The side view, which is not so broad as the front one, is inflated at the base and attenuated upwards into a short neck, and emarginate and slightly dilated at the end. The terminal lobe, as seen by an end view, is four-lobed.

This is a very beautiful species, and once seen, is not liable to be confounded with any other British species, but may be easily known by the conic granules covering the frond and giving a dentate appearance to the outline.

Plate VI. fig. 3. *Euastrum verrucosum*: *a*, front view; *b*, side view; *c*, end view of terminal lobe.

2. *E. oblongum*. Frond smooth, oblong; segments five-lobed; lobes broad, subcuneate, emarginate, the terminal one partly included in a notch. *Euastrum Pecten*, Ehr. Infus. p. 162. tab. 12. fig. 4; Pritch. Infus. p. 196. *Echinella oblonga*, Grev. in Hook. Br. Fl. vol. ii. p. 398 (1830). *Cosmarium oblongum*, Menegh. *l. c.* p. 221. *Eutomia oblonga*, Harv. Br. Alg. p. 188.

In boggy pools. Warbleton, Sussex, and near Tunbridge Wells, Weston Bog near Southampton, *Mr. Jenner*; Penzance, Dolgelley and Carnarvon.

Fronds large, appearing to the naked eye like small dots, oblong, three or four times longer than broad; each segment divided into five lobes in a pinnatifid manner. The lateral lobes are broad, cuneate, with a broad shallow notch. The terminal lobe is cuneate and its notch closed; the corners of all the lobes are rounded.

The surface of the empty frond is minutely punctate.

Plate VI. fig. 4. *Euastrum oblongum*: *a*, front view; *b*, side view; *c*, empty frond.

3. *E. Pelta.* Fronds smooth, subquadrilateral, three-lobed; terminal lobe partly included in a notch formed by the ends of the lateral lobes. *Cosmarium Pelta*, Corda, Alm. de Carlsb. p. 121; Menegh. *l. c.* p. 222.

In fresh-water pools. Weston Bog near Southampton, Ashdown Forest, Sussex, and Fisher's Castle, Kent, *Mr. Jenner*; Dolgelley, Penzance.

Fronds large, visible to the naked eye, about three times longer than broad, of a quadrilateral form with rounded ends; terminal lobe cuneate, partly included between the ends of the lateral lobes, rounded and emarginate, the notch closed; the segments of the frond are very broad, three-lobed, or rather each segment has a subquadrate base and a terminal lobe. The basal portion is not attenuated, and each lateral margin has a broad shallow notch or sinus, in which there is sometimes a slight intermediate rounded projection.

The colouring matter is dark green with large scattered granules; but the margin of the frond is generally colourless.

The surface of the empty frond is minutely punctate.

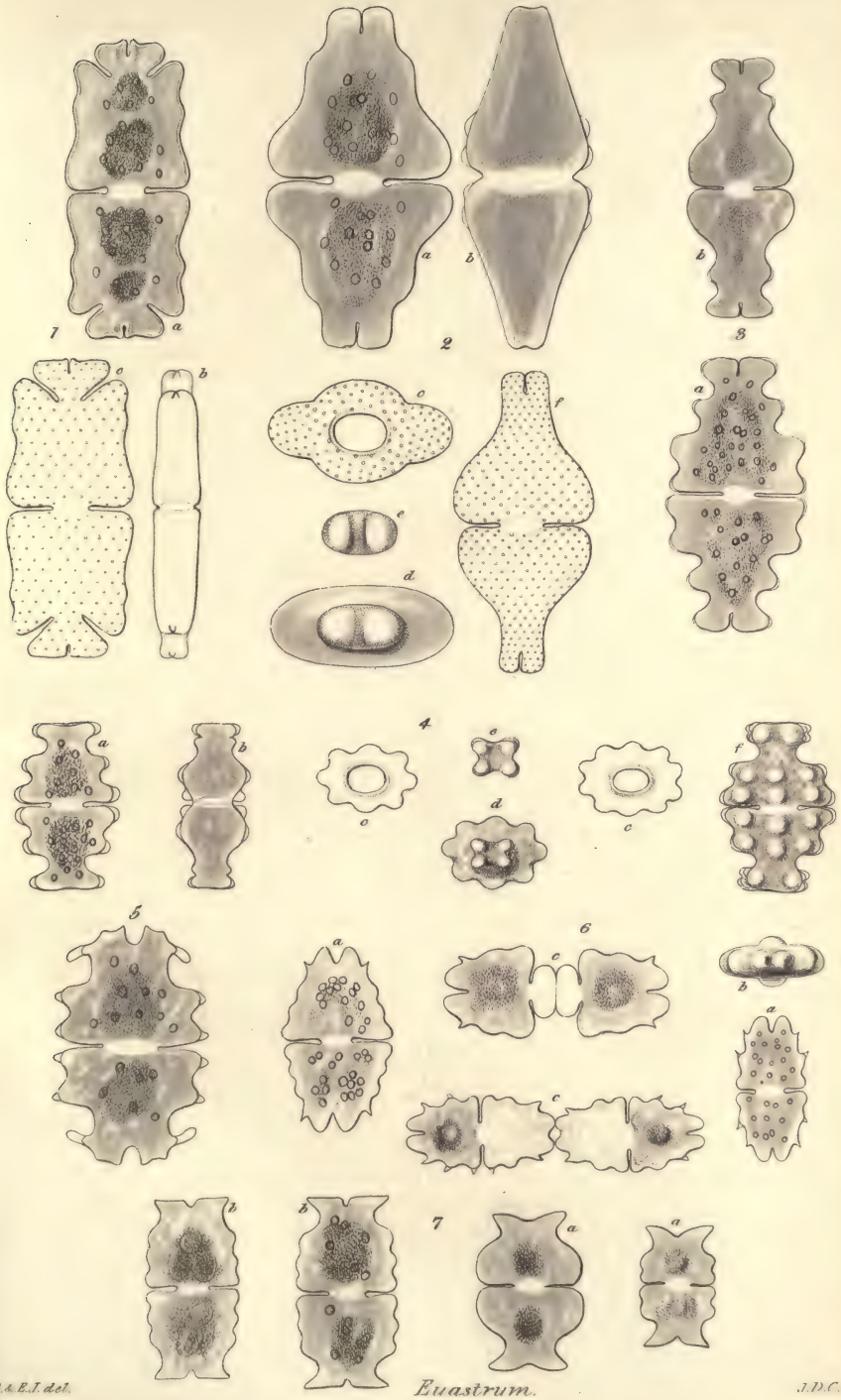
Plate VII. fig. 1. *Euastrum Pelta*: *a*, front view; *b*, side view; *c*, empty frond.

** *Terminal lobes exserted and connected to the basal portion by a neck-like contraction of the segment; the corners of the lobes rounded.*

4. *E. didelta.* Segments inflated at the base and constricted upwards; the end scarcely dilated; the base is entire or slightly emarginate. *Heterocarpella didelta*, Turp. Mem. p. 295 (1828). *Heterocarpella polymorpha*, Ktz. Synop. Diatom. in Linnæa 1833, p. 70. fig. 82 (some figures only and those not good). *Euastrum ansatum*, Ehr. Infus. p. 162. tab. 12. fig. 6; Pritch. Infus. p. 196. *Cosmarium didelta*, Menegh. *l. c.* p. 219.

In fresh-water pools, probably common, near Southampton. Not uncommon in Sussex, *Mr. Jenner*; Henfield, *Mr. Borrer*; Cheshunt, *Mr. Hassall*; Barmouth, *Rev. T. Salwey*. Carnarvon, Dolgelley, near Carmarthen, and Penzance.

Fronds about three times as long as broad, scarcely visible to the naked eye; the segments have some resemblance to a decanter, especially when dilated at the end. The entire frond may also be compared to the figure of the bones in the knee-joint.



J.R. & E.J. del.

Euastrum.

J.D.C.S. fe.

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Each segment is inflated at the base and attenuated upwards; in general the end is slightly dilated, and the notch is rather deep but not gaping. In some specimens the sides are entire, in others they are slightly emarginate. The end view is elliptic and entire with the exception of the transverse notch. A transverse view is longer than broad with rounded and entire ends, and the sides slightly inflated in the middle. The opening which marks the place where the segments are connected is small and circular.

The empty frond is punctated.

Plate VII. fig. 2. *Euastrum didelta*: *a*, front view; *b*, side view; *c*, transverse view; *d*, end view; *e*, end view of terminal lobe; *f*, empty frond.

5. *E. affine*. Segments emarginate at the sides near the base; the end dilated, emarginate, rounded at the corners, and the neck with a rounded projection on each side.

In peat-pools near Dolgelley.

Fronds about as large as those of *Euastrum didelta*; the segments somewhat resemble a decanter in form; the base is broad and inflated and contracted upwards into a wide neck; the dilated end may be compared to a thick rim of a decanter, and on each side of the neck is a small projection or tubercle; the terminal notch is deep but not gaping. The body of the segment is broadly emarginate at each side; all the lobes or projections are rounded, and the sinuses shallow.

This form approaches to *Euastrum didelta*, of which it may perhaps eventually prove merely a variety; but as I have gathered both forms unmixed with each other, and the present plant, besides the above characters, has protuberances on the front surface, I venture to keep them separate. Although I have not seen it, I suspect that a transverse view may afford additional marks of distinction.

Plate VII. fig. 3. *Euastrum affine*: *a*, mature plant; *b*, young frond.

6. *E. gemmatum*. Segments emarginate at the sides near the base, suddenly contracted into a very short neck; terminal lobe much dilated, obscurely emarginate. *Cosmarium gemmatum*, Breb.; Menegh. *l. c.* p. 221.

β. Terminal lobe emarginate at each side.

In peat-pools near Dolgelley; Penzance, *J. R.*; Weston Bog near Southampton, *Mr. Jenner*.

β. Dolgelley.

Fronds rather smaller than those of *E. didelta*, nearly three times as long as broad; each segment consists of a broad basal portion, which is somewhat quadrilateral and emarginate at each side, and suddenly contracted to form the very short neck; the terminal lobe has each side elongated and rounded, entire in *α* and slightly emarginate in *β*; the terminal notch is very obscure. A transverse view is twice as long as broad, with two rounded

projections at each end and three on each side, and a small central opening at the original junction-point of the segments. In the specimens I gathered the terminal notch was but slightly marked, partly perhaps on account of their immaturity, since in all the species it is obscure in the young frond; I doubt however whether it is ever so remarkable in this as in the other species*.

This plant agrees in its decanter-like form with the two preceding species, but I cannot suppose it to be a variety of either; for in this genus the projecting parts are much less developed in the young than in the adult plant, and nevertheless they were more evident in my immature specimens than in either of the other species.

Whilst engaged in examining this species, I was first struck with the advantage to be derived from the figure of the transverse view in the discrimination of nearly allied species. I have since obtained Meneghini's Synopsis of this family, and find that he has extensively availed himself of it in forming his specific characters of this genus.

Plate VII. fig. 4. *Euastrum gemmatum*: *a*, front view; *b*, side view; *c*, transverse view; *d*, end view; *e*, end view of terminal lobe; *f*, var. β.

**** Segments with the end acute at the corners, or with acute lateral processes.*

7. *E. rostratum*. Basal lobes of the segments broad and emarginate, terminal lobe with a curved, acute, spine-like process on each side.

In fresh-water pools near Dolgelley.

Frond very minute, about twice as long as broad; segments obscurely three-lobed, or rather with a broad base which is emarginate at each side, and then contracted into a broad short neck connecting it with the terminal lobe. The terminal portion has on each side a curved subacute tubercle or process, somewhat like a beak; the end of the lobe is prominent, generally angular, with a deep rounded terminal notch.

This species, like the last, is contracted, but less decidedly, into a broad, very short neck, and has emarginate sides, but differs from it in its much smaller size, and especially in having acute projections at the sides of the terminal portion. As in these respects it approaches the two following, it seems to connect them with the preceding species.

Plate VII. fig. 5. *Euastrum rostratum*.

8. *E. spinosum*. Fronds oblong; segments obscurely lobed, with a spine-like process on each side near the extremity; the end protuberant and rounded.

In fresh-water pools. Cheshunt, *Mr. Hassall*; Barmouth, *Rev. T.*

* I have since examined mature specimens and found the terminal notch always obsolete.

Salwey; Mayfield and elsewhere in Sussex, near Southampton; *Mr. Jenner*; Dolgelley, Penzance.

Fronds very minute, about twice as long as broad; segments scarcely lobed, the base slightly emarginate at each side, not contracted into a neck, but with an acute, short, spine-like process on each side near the end; the end itself is produced beyond these spines and rounded; the notch is rather deep and slightly gaping. Sometimes the base has one or two spine-like projections on each side.

This species differs from *Euastrum rostratum* in not being contracted into a neck, and in its prominent pouting extremity, which is not at all angular beyond the lateral spines.

Plate VII. fig. 6. *Euastrum spinosum*: *a*, front view; *b*, end view; *c*, fronds dividing.

9. *E. binale*. Segments concave or truncate at the end, not projecting beyond the acute angles. *Heterocarpella binalis*, Turp.; Kutz. *l. c.* p. 70. *Cosmarium binale*, Menegh. *l. c.* p. 221.

a. Segments inflated at the base; the notch broad, forming a concavity between the angles.

β. *truncatum*. Fronds quadrilateral; the end truncate, acute at the angles, with a small triangular notch in the middle.

In fresh-water pools. Mayfield and Piltdown Common, Sussex, *Mr. Jenner*; Dolgelley, Penzance.

Fronds very minute, about twice as long as broad; segments inflated at the base, either entire or somewhat bicrenate at the sides, slightly contracted upwards and rather dilated at the end; the terminal notch forms a concavity between the two acute angles.

The variety *β*, which may prove distinct, differs in being quadrilateral, and still more in having truncate ends with a small but distinct notch in the centre; the angles are acute, and slightly project laterally; the sides of the segments are generally a little crenate.

This species is easily distinguished from the two preceding ones by its concave or truncate ends and its notch, the sides of which do not project beyond the lateral spines or angles.

Plate VII. fig. 7. *a*, *Euastrum binale*; *b*, var. *β*.

Analysis.

1. Terminal lobes distinct, cuneate, partly included in a notch formed by the lateral lobes 2
   Terminal lobe not included in a notch 4
2. Frond rough with large conic granules, which give a dentated appearance to the outline ..... *verrucosum*.
   Frond minutely punctate 3
3. Segments distinctly 5-lobed, all the lobes emarginate ... *oblongum*.
   Segments 3-lobed ..... *Pelta*.

4. Terminal lobe connected with the base by a neck-like contraction of the segment, the corners all rounded..... 5
   Terminal lobe often indistinctly separated from the base of the segment, with an acute angle or process on each side 7

5. Segments but slightly dilated at the end..... *didelta.*
   Segments much dilated at the end 6

6. Terminal notch strongly marked; the neck of the segment with a tubercle on each side..... *affine.*
   Terminal notch obscure; no tubercle on the neck of the segment ..... *gemmatum.*

7. End concave or truncate; the acute angles as high as the sides of the notch ..... *binale.*
   End rounded or angular, projecting beyond the spine-like processes 8

8. Terminal lobe dilated laterally, and connected with the segment by a neck-like contraction ..... *rostratum.*
   End protuberant; no neck-like contraction of the segments..... *spinosum.*

XXVI.—Caroli Linnæi *Exercitatio Botanico-Physica de Nuptiis et Sexu Plantarum.* Edidit et Latine vertit M. Johannes Arv. Afzelius.

PREFATORY NOTICE BY M. AFZELIUS.

It is stated by Linnæus, in his Autobiography*, that after he had become acquainted with the short treatise of Vaillant on the Sexes of Plants from the 'Acta Lipsiensia,' he began to contemplate a more diligent investigation into the nature of the stamina and pistilla of flowers; that after long and diligent research he came to the conclusion that these constitute the principal parts of the flower; and a new prospect broke upon his youthful mind of thence establishing a Method in Botanical arrangement. About the end of the same year, 1729, George Wallin, at that time librarian at Upsal, published a philologico-critical Dissertation entitled 'De Nuptiis Arborum,' which appearing to Linnæus but little to the purpose, and not having leisure for a public disputation, he drew up in a few pages, "more botanico," as he expresses it, a view of the right notion to be entertained concerning the Sexes of Plants, and communicated them to his earliest patron in the Academy, Ol. Celsius, Doctor in Divinity. Afterwards they fell into the hands of Ol. Rudbeck, jun., at that period professor of medicine and botany at Upsal, who was so much pleased with this early specimen of his genius, that in the following year (1730), having received an honourable exemption from the labours of his office on account of his advanced age, he procured the nomination of Linnæus as his substitute; and thus—a circumstance almost without parallel—the duties of a lecturer on botany were com-

* Published at Upsal, 1823, 4to, p. 15.

mitted to an academical student of scarce three years' standing. This first essay of Linnæus on the Sexes of Plants was afterwards overlooked: it does not appear among his published works, and perhaps was judged by himself as of minor value, after the development of his Sexual System had yielded a more fruitful subject for his immortal works. However this may have been, assuredly the first essays of so great a genius were not to be lost to posterity. By good fortune it happened that a manuscript copy of the 'Prælectiones Anatomicæ,' delivered at Upsal in the year 1731, although in a somewhat mutilated condition, was discovered in the shop of a tradesman of this city *; at the end of which is subjoined, written in the same hand, 'Exercitatio Botanico-Physica de Nuptiis et Sexu Plantarum, &c. authore Carolo Linnæo, Medicin. et Botan. Studioso.' The tract does not appear to me to be in the hand-writing of Linnæus, but rather to be a transcript from the autograph in an antique hand, and somewhat resembling that of Linnæus. With the exception of the title-page and syllabus it is written in Swedish, and comprised in 22 pages. From the conjoined testimony of time, title and context, we feel no hesitation in concluding that this is the very work of which we have been speaking. We have therefore been the more anxious to publish this juvenile essay of Linnæus, since, after a diligent search, it appears that it has been hitherto unpublished, and is further worthy of attention from the consideration that it is the earliest in date (in the 23rd year of his age), and that it contains the earliest of his writings relative to the Sexual System.

A Latin translation is here appended to the Swedish text†, that it may be understood by foreigners. The style of Linnæus is well known, being distinguished by a primæval simplicity and a certain native vigour. In this little work the style certainly is characterized in some places by florid exuberance, and the great interpreter of nature pursues his subject with a kind of sacred ardour. In the translation I have chiefly aimed at fidelity; how far I have succeeded, the kind reader must determine.

Exercitatio Botanico-Physica de Nuptiis et Sexu Plantarum in qua recentiorum Botanicorum Placita et Observationes recensentur, authore Carolo Linnæo, Medicin. et Botan. Studios.

Syllabus.

§ 1. Introductio.
2. Veterum divisio sexus in plantis.
3. Vita vegetabilis probatur.
4. Requisita utriusque sexus.

* By the learned J. Liden, Licentiate in Medicine, to whose kindness I am indebted for it.

[† We have given only the Latin version of M. Afzelius.—Ed. Ann. N. H.]

§ 5. Vaillant huic sese præ aliis studio addixit.
6. Quod in flore quærenda sit sexus distinctio.
7. Ex collatione florum sexus apparet.
8. Partes floris quæ ?
9. Calyx ad generationem nihil confert.
10. Neque petala.
11. Sed stamina et pistillum.
12. Flores cum fructu juncti.
13. Flores a fructu separati in eadem planta.
14. Flores a fructu separati in diversa planta.
15. Explicatio partium floris, exinde dependens distinctio sexus secundum Vaillantium.
16. Nuptiæ plantar. quid ?
17. Analogia hermaphroditar. in regno animali et vegetabili.
18. Morilandi sententia de fecundatione rejicitur.
19. Modus fecundationis ignotus, sed quod fiat probatur.
20. α. a curvatura styli in quibusdam.
21. β. a detrimentis quæ pluviæ adferunt.
22. γ. a staminum positura ad pistillum.
23. δ. a fecundatione ante progerminationem foliorum.
24. ε. a marcescentia staminum post fecundationem.
25. ζ. a natura Palmæ et Moschatæ.
26. η. a castratione florum.
27. de ovis plantarum.
28. de cotyledonibus.
29. Clausula.

§ I.

Verno tempore, cum Sol almus ad terras boreales redit, iterumque in vitam corpora, hiberno frigore suppressa, revocat ; ecce ! tum animalia omnia, sub hieme gravia et torpentia, lætiora et alacriora fiunt ; ecce ! tum aves omnes, quotquot hieme siluere, iterum cantare et garrire incipiunt ; ecce ! tum insecta omnia ex latebris prorumpunt, in quibus sopita jacuere ; quin ipse homo quasi novus reviviscit ; haud inepte igitur Plinius : Sole nihil utilius.

Idem ille Sol gaudio omnium exhilarat vitam supra quam dici potest. Tum Tetricem et Urogallum licet videre ludentes ; pisces lasciviunt, atque animalia omnia in venerem ruunt.

Omnia vere vigent, et veris tempore florent,
Et totus fervet veneris dulcedine mundus.

Quid ? quod amore ipsæ tum plantæ afficiuntur, cum inter illas, et mares et feminæ, quin et hermaphroditi ipsi nuptias celebrant. Hoc ipsum mihi jam in animo est enarrare, et ex ipsis plantarum genitalibus indicare, qui mares, quæ feminæ, qui hermaphroditi sint.

§ II.

Veteres Botanici, in densis tenebris errantes, in sexu aliquo plantarum investigando laborare videbantur : mares et feminas distinguere cœperunt, sæpius vero tam infelici eventu, ut cum horrore demireris ; aliter autem fieri non potuit, distinctionibus a crassitie et gracilitate caulis petitis : sic, quæ separanda erant, conjunxerunt,

quæ autem natura junxit, separarunt. Quorum sententias qui cognoscere studet, dissertationem (modo hic ventilatam) 'de Nuptiis arborum' evolvat, in qua eorum omnium compendium est, quæ veteres de hac re dixerunt.

§ III.

Recentiores Botanici permagnam analogiam inter vitam humanam et plantas videre sibi visi sunt; illas scilicet suis quibusdam morbis, perinde ac nos affici, ut Cancro, Pernionibus, Lumbricis, Acaris, Tabe, Peste &c. [In Germania non longo abhinc tempore pestis quædam arbores infestavit, quæ plus detrimenti silvis attulit quam unquam securis.] Ab iis observatum est, plantas abundantia nutrimenti luxuriari, defectu marcescere; calore solis, unde omnium vita est, expergefactas viridia explicare folia variosque flores, atque superbire haud minus quam nautæ, qui festis diebus totas naves magnificis superinstruunt vexillis: at ingruente frigida, vitæ omnis invida, hieme, arbores, sopore graves, pulchras omnique ornatu decoras vestes deponere, quemadmodum et insecta omnia sopita jacent, usquedum iterum veris calore excitentur. Observatum quoque est, suam cuique plantæ esse magnitudinem atque ætatem, omnesque juventute steriles, media ætate fructuosissimas, senectute tabescere. Malpigius et Grewius anatomiæ ope ostenderunt, plantis vasa, quibus succus nutricius circumferatur, et fibras aliasque permultas inesse partes, quæ analogiam cum animalium corporibus præbeant: quotannis etiam proprio fructu sese multiplicare visæ sunt, quæ omnia illis cum animalibus communia sunt. His innumerisque aliis de caussis facile concludere potuerunt, vitam vegetabilem fere æque perfectam esse quam animalem; et quamvis plantis sensus desit, non ideo dici posse eas vita carere. Quis apoplectico vitam inesse neget, quamvis omnes sensus perdiderit?

§ IV.

Huc usque progressi perbene intellexere organa generationis antea quærenda esse, quam plantarum in mares et feminas distinctiones fierent. Et, cum fructum haberent, necessario inde sequebatur, quum natura simplicissima sit, semperque sibimet constans, etiam organa maris adesse debere, quæ hunc fructum vivificarent. E regno enim animali scimus, ad omnem fœtum mares requiri, qui genituram emittant, qua ova imprægnentur, priusquam in fœtum perfectum exire possint.

§ V.

Hanc inprimis rem eximius Vaillantius sibi explicandam sumsit, cui totam suam Methodum Botanicam superstruere in animo habuit, nisi triste fatum præmatura eum morte nobis eripuisset, die x Maji MDCCXXII. Nonnihil tamen de hac re prius publici juris facere potuit, Sermonem scilicet *de structura et differentia florum, usuque partium eos constituentium* &c. Lugd. Batav. MDCCXVIII. 4to, Gallice; quem vero nondum vidi.

§ VI.

Si igitur scire velis utrum plantæ mares an feminæ sint, organa generationis, ut jam dictum est, inspicienda sunt. Probe scimus, post florem fructum provenire, fructumque re vera fœtum esse; nullus

fit fructus nisi flos prius fuerit, nullusque in regno animali fœtus sine prævio congressu; si igitur absque dubio flos æque necessarium est antecedens fructus, atque organa genitalia maris et feminæ fœtus, inde omnino sequitur, in flore necessario reperiri debere ipsa organa generationis, quæ in illo vicem maris et feminæ suppleant.

§ VII.

Cum igitur perspicuum sit, in flore plantæ genitalia inesse, omnibus plantis inter se comparatis, patebit, probatam esse veritatem, omnes, quæ pistillum cum rudimento fructus habent, feminas, contra, quæ stamina cum apicibus, mares, quæ vero utraque habent, hermaphroditos esse; quod posthac demonstrabo.

§ VIII.

Partes florum sunt:

1. Calyx seu ollula, cui affixa sunt
2. Petala seu folia in ipso flore;
3. Stamina, quibus semper insident
4. Apices seu antheræ;
5. Pistillum seu Stylus, qui insistit
6. Fructui, qui in Capsulam abit.

§ IX.

Omnes flores, mihi obvenientes, cum inspexero, permulta inveni genera quæ calyce careant, ut Tulipa, Mesonora, Tusai, Muscari, Hyacinthus &c., quorum tamen fructus maturescit et seri potest; calyx igitur non necessarius est ad fructificationem.

§ X.

Si quæris, an petala, in quibus Tournefortius, Rivinus et alii Botanicen totam fundarunt, organa sint generationis, facile invenies, eadem innumeris deesse floribus, ut omnibus Apetalis, Stamineis et Amentaceis; e. gr. gramini Cyperoidi, Scirpoidi, Sparganio, Corylo, Quercui, Ficui &c. &c. Hi omnes semina fecunda proferunt; unde sequitur etiam petala parum ad fructum parandum conferre.

§ XI.

Si autem de staminibus cum apicibus, et pistillis cum fructu investigaveris, ea semper adesse invenies, his scilicet tribus modis:

§ XII.

a. Maxima pars plantarum in uno eodemque flore et stamina et pistillum habent, ut Liliago[1], Tunica[2], Hottonia[3], Trientalis[4], Dortmanna[5], Hypopithys[6], Odontites[7], Subularia[8], Draba[9], Rorella[10], Portula[11], Stellaria[12], Trollius[13], Cynapium[14], Cracca[15], Corallorrhiza[16], Morocarpus[17], Pinastella[18], Scirpoides[19], Tetralix[20], Ledum[21], Pilularia[22], ceteræque fere omnes.

[1] Vaill.
[2] Rupp.
[3] Boerhav.
[4] Rupp. Fl. Jen.
[5] Rudb. f. Act. Lit. Sv.
[6] & [7] Dillen. N. pl. g.
[8] Raii Syn. iii.
[9] Dill. N. pl. g.
[10] Dill. Cat.
[11] & [12] Dill. N. pl. g.
[13] Rupp. Fl. Jen.
[14] & [15] Rivin. pent. irr.
[16] Kram. et Rupp.
[17] Rupp.
[18] Dill. N. pl. g.
[19] Mont.
[20] & [21] Rupp.
[22] Vaill.

§ XIII.

β. Quædam plantæ flores duplicis speciei distinctos in uno caule habent, quorum altera species stamina et apices sine pistillis, altera pistilla tantum sine staminibus et apicibus habet; hi fecundi sunt, illi vero flores steriles. Quorum perplures Tournefortius enumerat et 'Flores a fructu separatos in eadem planta,' vocat. Corylus, e. gr. julos suos habet, qui per totam hiemem arbori insident, non autem maturescunt prius quam mense Martii aut Aprilis, cum e gemmis ejusdem arboris tenues cirrhi capillares, qui non nisi pistilla sunt, proveniunt et fecundantur a farina illa, quam eodem tempore superimpendentia emittunt nucamenta, quæ ex innumeris parvis staminibus cum suis apicibus constituuntur. Quod ubi factum est, juli, quia inutiles, ex arbore decidunt; loco vero, quem pistilla parva occupaverant, nuces æstate sequente enascuntur. Tournefortius, ut jam diximus, numerum magnum hujus generis enumeravit; multos tamen omisit, quos alii auctores postea observarunt; necesse igitur mihi videtur omissos heic enumerare. Hi sunt:

AMENTACEI.	PETALATI.	APETALI.
Juglans, Tournef.	Cucurbita, P.	Xanthium, T.
Corylus, T.	Cucumis, P.	Ambrosia, T.
Carpinus, T.	Melo, P.	Gnaphaloides, T.
Fagus, T.	Pepo, P.	— — —
Quercus, T.	Melo-pepo, P.	Myriophyllum, T.
Ilex, T.	Anguria, P.	Buxus, T.
Suber, T.	Colocynthis, P.	Empetrum, T.
Castanea, T.	Momordica, P.	Ricinus, T.
Taxus.	Bryonoides[2].	Cynocrambe, T.
Platanus, T.	Sicyoides, P.	Urticoides, P.
Pinus, T.	Viscus[3].	Ceratoides, T.
Larix, T.	Veratrum, P.	Sparganium, T.
Cupressus, T.	Sagitta, Dillen.	Typha, T.
Thuya, T.	Stratiotes, D.	Mays, T.
Cedrus, T.	Caupesa, Plum.	Lacrima, T.
Alnus, T.	Aurantium, P.	Cyperoides, M.[4]
Betula, T.	Citrium, P.	Acinaria[5].
Tenga, Ponted.	Limonicum, P.	Mnium, Dill.
Chaunga, P.	Punica, P.	Lichen, Dill.
Suddapana, P.	Begonia, Plum.	Ficus Hircus fil.[6]
Katovindel, P.	— — —	Coriaria, Nissol.[7]
Dactyloides, P.	Ricinoides, T.	Blitum[8].
Moriformis[1].	Basella.	Stellaria, Vaill.

[1] Per *Moriformem* intelligo speciem unicam Mori, quod flores a fructu in planta eadem sejunctos profert; contra in aliis.

[2] Per *Bryonoidem* vero Bryoniam Zeyland. foliis profunde laciniatis. T.

[3] *Viscus*, teste Pontedera, flores fert a fructu remotos: alii contrariam fovent sententiam.

[4] *Cyperoides* probe distinguendum est a Scirpioide Monti.

[5] *Acinaria* a me vocatur planta quædam exotica quæ ab eo dicitur: Fucus folliculaceus fœnicul. fol. long. in CB.

[6] *Ficus* flores masculini tripartiti, feminini 5-partiti: ambo in uno fructu nascuntur, sed masculini supra femininos. Dill. N. pl. g. 182.

[7] *Coriaria* vid. descript. nov. pl. g. Dill. 158.

[8] *Blitum* album majus Dill. 164.

§ XIV.

γ. Alia tandem invenitur plantarum species, quæ nonnullis in stirpibus flores cum integris apicibus sine pistillis habet, in alius autem speciei stirpibus flores cum pistillis sine apicibus: hi fecundi, illi vero steriles sunt; utrique vero ex seminibus ejusdem speciei nascuntur. Flores autem fecundi et steriles generis antecedentis in eadem radice eodemque caule gignebantur; hujus igitur generis flores ab illius in eo differunt, quod in radicibus distinctis nascuntur, quamvis facies externa fere eadem sit. Has Tournefortius 'Plantas, quarum aliæ fructibus, aliæ floribus donantur,' appellat. Eas in diversas species distinguere velle, æque absurdum esset, ac si quis ovium aut canum marem et feminam in diversas species distingueret; præsertim si ab eadem matre nati essent. Cannabis, ex. gr. ex ejusdem speciei seminibus cannabis et sterilis et fecunda oritur; flores cannabis sterilis stamina et apices habent, semina autem nulla proferunt, carent enim pistillo; at contra cannabis fecunda pistillum habet, sed neque stamina, neque apices, et semina profert. Ejusmodi sunt:

Sabina[1].
Salix, T.
Populus, T.
Juniperus, Volk.
Gale, Vaill.
Morus, P.[2]
Terebinthus, T.
Lentiscus, T.
Rhamnoides, T.
Casia, T.
Palma, P.
Ampanna, P.
Mamœra, T.
Urtica, P.[3]
Mniodes[4].
Fraxinus[5].
Pulicaris[6].
Mercurialis, T.
Spinacia.
Lupulus, T.
Cannabis, T.
Cannabina, T.
Ceratoides, T.
Bryonia, P.[7]
— — —
Tamnus, P.[8]
Valerianella[9].
Cervispina[10].
Ornus, P.[11]
Otites, Fab.
Impia[12].
Papaja, P. HM.[13]
Laurus[14].

Anomalæ
duplices flores
præferentes.

Opulus, Ruell.
Atriplex.
Parietaria.
Limon.
Acer.
Arum.
— — —
Helleborus.
Trollius.
Napellus.
Cardamindum.
Parnassia.

§ XV.

Vaillantius partes florum hoc modo declarat: Fructum tenellum Ovarium appellat; quia eodem fungitur munere quo ovarium ani-

[1] *Sabina.* Rupp. i. g. marem et feminam exhibet.
[2] *Morus* e. g. Morus fl. albo T. et Morus vulgaris sterilis Pont. Morus insitiva fol. maj. et crassiore ex albo purpurascent. P.
[3] *Urtica* Pont. Urtica maxim.
[4] *Mnioiden* voco Mnium quod Raio recensetur distinctum esse sexu.
[5] *Fraxinus,* observ. Rupp. 314 et experientia.
[6] *Pulicaris,* per hanc intelligo Scirpioiden seminibus puliciformibus, quæ, ut mihi videtur, ex S. K. (?) 497 sexu distincta. [7] *Bryonia* sc. aspera Rai.
[8] *Tamnus* sc. racemosus. [9] *Valerianella,* Val. palustris minor.
[10] *Cervispina* s. Rhamnus catharticus, observante Dillenio.
[11] *Ornus* s. Fraxinus humilior s. alt. Theophrast. [12] *Impia,* Plin.
[13] *Papaya,* Tournef. in eadem, Hort. Mal. et Pont. in diversa collocant flores. [14] *Laurus* Rupp. 83.

malium, quod omnia in se includit semina seu ova progignenda. Stylus seu Pistillum, huic insistens, Tuba dicitur ex analogia Tubæ Fallopianæ in regno animali. Flores omnes qui habent ovarium cum tuba, quippe quæ organa sint sexus feminini, Feminas vocat. Mares vero ab eo appellantur illi, qui stamina tantum et apices habent; namque stamina Vasa spermatica, et apices Testiculos vocat, quoniam per illos emittitur farina genitalis (pulvis, qui testiculis maturis excidit), quæ semina fecundat. Semina Ova nominantur, cum totum futuræ plantæ rudimentum contineant. Sterilis igitur Cannabis mas, fecunda vero femina est; etiamsi contrario modo nonnulli, sed false, disseruerint. Hermaphroditi sunt omnes qui et testiculos et ova habent.

§ XVI.

Petala ipsa generationem non juvant, sed tori instar habenda, quem Creator tam magnifice distinxit, tot splendidis exornavit conopeis, et tot suavibus implevit odoribus, ut sponsus sponsaque tanto majore cum sollennitate nuptias ibi celebrent. Toro nunc ita strato, sponsus tandem sponsam amplectitur caram eique dona sua largitur. Tunc testiculi se aperire videntur, pulverem effusuri genitalem, qui in tubam decidens ovarium imprægnat.

§ XVII.

Maximam partem plantarum hermaphroditos esse nulli mirum videatur, quum idem in classe regni animalis infima spectandum se præbeat; omnes scilicet cochleas similem genitalium in uno individuo conjunctionem habere; et id quidem propter tardiorem ipsarum motum, qui segnitiam prodit, quæ quidem tanta est ut totum genus periret priusquam conjux alter alteri occurreret, nisi natura hoc modo segnitiam earum compensavisset. Plantas, quas longe firmius in loco defixit, natura hermaphroditos fecit.

§ XVIII.

Fecundatio quomodo fiat, difficilius est demonstratu. Morilandus, qui ex professo animum in id intendit ut hanc rem illustraret, judicavit farinam seminalem tot parvulis plantis seminalibus constare, quot ibi grana essent, quæ per infundibulum et tubam in ovarium effunderentur, ibique vacua inirent semina eademque parvulis plantis seminalibus implerent, et hoc modo semina fecundarent. Argumentum hujus sententiæ diversa præbuit figura, quam in farina testiculorum in singulis speciebus observandis oculo armato contuitus est, et notavit, particulas farinæ istius æque inter se distinctas esse, ac ipsarum plantarum facies externa in diversis speciebus. Figuræ hujus pulveris in Act. Erud. Lips. 1705, p. 275, inveniuntur. Cum vero irrita facta sit thesis Leuwenhoekii, quæ statuit genituram maris, plenam innumeris vermiculis, quos homunciones in homine esse dixit, exire e testiculis virorum in ovarium feminæ, unum vero horum vermiculorum in cicatriculam ovi, tunc vacuam, irrepere, et, ovo in uterum immisso, ibi in fœtum perfectum accrescere: hac, ut diximus, irrita facta, quandoquidem probatum est cicatriculam ovi non vacuam esse, sed omne rudimentum futuri fœtus cum fibris suis primordiali-

bus in ea contineri ante fecundationem, non minus in animalium quam plantarum ovis; in nihilum etiam redacta est ante allata sententia Morilandi, qui hac in re Leuwenhoekium imitari conatus est.

§ XIX.

Fecundationem fieri perspicuum nobis est, licet modum ejus oculis subjicere non possimus. Quis enim tam inconsideratus, ut credat genituram maris ovum feminæ non vivificare in regno animali, ideo quod nondum satis demonstrari possit, quomodo fiat? Sed quia unicuique de conceptu animalium facilius persuadetur quam plantarum, experimenta quæ sequuntur mihi auxilio erunt:

§ XX.

a. Quidam florum tubam habent longam, brevia vero vasa spermatica, quare farina genitalis sursum ferri et in infundibulum tubæ immitti non posse videtur, præsertim cælo humido et pluvioso; ingruente vero tempore, quo subtilis farina e testiculis decidit, infundibulum tubæ ad testiculos se incurvat (quod quidem artificium est sapientissimi Creatoris, maxima dignum admiratione) ut imprægnetur, haud multo aliter quam papilio femina, quæ, cum a marito quæritur, prosternit se humi extensis alis, caudamque in altum tollit, quo commodius amplexum ejus recipiat. Deinde, cum tuba hujusmodi florum incurvata fuerit, donec farina e testiculis effundi destiterit, in altum rursus se tollit. Quid igitur opus esset ut tuba se incurvet ad testiculos eo ipso tempore quo farina effunditur, et hac effusa erigatur, nisi ut a farina fecundetur?

§ XXI.

β. Agricolæ omnes narrare solent, spicas minus ditari granis, cum pluerit eo tempore quo seges fumat. Qui quidem fumus nihil aliud est nisi segetis farina seminalis e testiculis exiens ut tubis adhærescat, a pluvia vero humi funditur, unde major vel minor sterilitas.

Hortulani omnes prædicere norunt, fructum haud proventurum esse cum pluvia in flores effusa fuerit, ut mala, pira, pruna, cerasa, fabæ &c.; quod etiam de plantis sponte crescentibus valet.

§ XXII.

γ. Maxima pars plantarum, testiculos ab ovario sejunctos in eadem planta habentium (§ XIII.), flores masculinos in eodem caule supra flores femininos habet, ut farina testiculorum in tubas decidat commodius, quam si flores feminini locum superiorem tenerent, et ita farina sursum tenderet. Ex. gr. Mays, Typha, Cyperoides, aliique castrari possunt.

§ XXIII.

δ. Ut accuratius summi Creatoris perspicias providentiam, jucundum erit observare, omnium arborum amentacearum æque flores ipsos masculinos in nucamentis suis, ac flores femininos seu cirrhos enasci et præparari, quo farina genitalis decidat in tubas easdemque fecundet prius quam folia harum arborum explicentur, quippe quæ aliâs tubas tegerent, adeoque aditum farinæ prohiberent. Exempla nobis sunt Corylus, Juglans, Quercus et Fagus.

§ XXIV.

ε. Tubam maxime florescere eo tempore quo farina e testiculis effunditur, videmus. Testiculi vero officio suo functi, cum genituram tradiderunt, marcescunt cum vasis suis spermaticis, et decidunt, quum inutiles sint. Non multo post flaccescit etiam tuba, jam inutilis; restat autem ovarium, donec semina matura protulerit. Inter papiliones etiam animadvertimus, mares statim post congressum emori, feminas autem vivere donec ova ediderint, paullo vero post perire.

§ XXV.

ζ. Multi veterum auctorum historiæ naturalis de natura Palmæ mentionem faciunt; marem scilicet dicunt ramos super feminam expandere, ut fecunda fiat, cum aliâs sterilis esset; ea certissime de caussa, quod farina maris tam gravis est, ut a vento agi non possit; directe igitur in tubam decidere debet, si quidem farinæ particeps futura sit. Mares quoque et feminæ arboris Moschatæ observantur. Si mares quidam inter feminas crescunt, tum feminæ fecundæ sunt, steriles autem fiunt si mares exciduntur. Hæ vero observationes de Palma et Moschata aliorum modo narrationibus nituntur.

§ XXVI.

η. Unum tantum experimentum, quod, ut spero, ad rem probandam sufficiet, addere lubet. Omnes si sustuleris testiculos floris hermaphroditi, ovarium quidem plantarum quarundam semina fert, sed plane infecunda, quæ nunquam progerminant, etiamsi solo vel fertilissimo disseminata fuerint. Maxima autem heic diligentia adhibenda est, ut testiculi amoveantur priusquam pulverem genitalem emittere cœperint, et ut flores nulli ejusdem speciei vicini sint, aliâs ventus subtilem farinam seminalem in tubam relictam asportat. En igitur heic veram plantarum castrationem artificialem! Equidem non ignoro, Pontederam observasse, Morum feminam baccas in Italia tulisse in horto quodam, quamvis nullus mas intra spatium quinquaginta milliariorum esset; ostendere autem non potuit, eundem fructum fecundum fuisse, seu, si seminatus fuerit, Moros parvas protulisse. Ex his omnibus certissime colligi potest, fecundationem fieri per testiculos eorumque farinam seminalem; nulla igitur caussa subest, cur sexus plantarum denegetur.

§ XXVII.

Restat jam analogiam inter semina plantarum et ova animalium probare. Non opus est, ut omne ovum testa dura et calcarea sit obductum, quemadmodum ova avium; omnium enim quadrupedum et ipsius hominis ova eandem desiderant. Neque albumen et vitellum necessaria sunt, quæ non in omnium piscium ovis reperiuntur; sed heic, ut pars maxime principalis, necessario requiritur parva cicatricula, quæ in omnibus conspicitur ovis, et accuratissime in ovo magnæ cujuslibet avis, ubi statim in conspectum venit, si testam a latere aperias. In hac cicatricula omnia rudimenta futuri fœtus sub minima mole convoluta jacent. Semina quoque omnia cicatriculam habent, quam auctores quidam Hilum appellant. Pisa nonnulla punctis ni

gris distincta sunt, quæ quidam Hilum esse, sed falsissime, putarunt; puncta enim hæc nihil aliud sunt quam cicatrices pediculi fracti, qui pisa leguminibus infixit; juxta hæc vero tuberculum prominet, instar rostri, in Cicere et Staphylodendro permagnum, quod vera est cicatricula, in qua omnes fibræ primordiales plantæ proventuræ latent. Malpigius in semine Caryophylli totam arborem Caryophylli sub minuta forma cum caule, foliis, radice &c. inesse ostendit. Nulli mirum videatur, hæc semina a me ova appellari; octoginta enim ante me annos celeberrimus Harveus idem nomen dedit, cum generationem æquivocam refutando palam exclamaret: Omnia ex ovo.

Ova plantarum in terra excluduntur, eodem modo quo ova avium sub alis, quadrupedum in utero, et piscium in aqua.

§ xxviii.

Planta primum ex ovo suo progerminans duo exserit folia, Cotyledones nominata, ex analogia quæ inter illa et placentas animalium, seu cotyledones, vaccarum et similium, locum obtinet. Hæ duæ cotyledones, antea inter membranas ovi occultæ, basin ejus constituerunt, et munere eodem heic funguntur quo vitellum in ovis avium, quod in placentam fœtus tenelli abit. Postquam teneræ illæ cotyledones apud embryonem parvum vicem impleverunt placentarum, decidunt simul atque ipse e terra se alere possit, quemadmodum placentæ animalium flaccescunt, cum fœtus se ipsum alere inceperit.

§ xxix.

Hæc sunt quæ breviter et sine ulla librorum evolutione, summa cum festinatione communicata volui de Sexu Plantarum, qui etiam particula quædam est Botanices, seu Scientiæ Divinæ, sic dictæ, quippe quæ exponit ea quæ Deus inter omnes res creatas tam magnifice fecit.

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PROCEEDINGS OF LEARNED SOCIETIES.

ZOOLOGICAL SOCIETY.

Dec. 12, 1843 (*continued*).—Wm. Yarrell, Esq., V.P., in the Chair.

"Descriptions of new species of Shells figured in the 'Conchologia Iconica,'" by Mr. Lovell Reeve.

Conus Deshayesii. *Con. testâ cylindraceo-ovatâ, tenuiculâ, inflatâ, pallidè olivaceo-fulvâ, profusè rubido-puncticulatâ, maculis albis grandibus, perpaucis, sparsim et irregulariter nebulosâ; spirâ depresso-planâ, apice mucronato; aperturâ dehiscente, fauce, quasi politâ, nitente.*

Conch. Icon., *Conus*, pl. 5. f. 28; *Conus cervus*, Sowerby, Conch. Illus., f. 94.

Hab. Swan River.

Only a few specimens of this very characteristic species, which may be readily recognised by its peculiar buff-tinted colour and light inflated growth, are at present known. It has been supposed hitherto to be the *Conus cervus*, but having lately examined, in the collection of M. Delessert, the identical shell described under that title by Lamarck, with the description of that illustrious author attached to it in his own handwriting, I am enabled to rectify an error which has unfortunately gained considerable circulation.

By the title now substituted for *cervus* in reference to the species under consideration, I wish to honour my kind and amiable friend M. Deshayes, now zealously occupied in completing the conchological portion of the new edition of Lamarck's 'Histoire des animaux sans vertèbres,' the publication of which has been long anxiously looked for.

Conus vidua. *Con. testâ turbinatâ, albâ, fusco subtilissimè reticulatâ, reticulis ruptis, subsparsis; fasciis binis nigerrimo-fuscis, maculis albis sparsis, irregulariter punctatis, cinctâ; spirâ concavo-depressâ, coronatâ, apice subobtuso.*

Conch. Icon., *Conus*, pl. 8. f. 45.

Hab. Island of Capul, Philippines (on the reefs); Cuming.

This curiously mottled Cone presents a very different style of painting from any hitherto described species. Several specimens were collected by Mr. Cuming.

Conus pictus. *Con. testâ oblongo-turbinatâ, tenuiculâ, subventricosâ, puniceo brunneove et albo alternatim fasciatâ, fasciis interstitiisque fusco alboque identidem tæniatis et variegatis; spirâ convexo-elatâ, ad marginem peculiariter strigatâ, aperturâ subinflatâ.*

Conch. Icon., *Conus*, pl. 18. f. 98.

Hab. ——?

The painting of this pretty shell is of very peculiar character, and I know of no other species with which any comparison can well be instituted. The most characteristic of two specimens now before me exhibits three broad pale scarlet bands, the lower being ornamented with two articulated fillets of brown and white, the middle with one only, whilst in the upper band the fillet is altogether wanting. The spaces between the bands are curiously variegated with brown (scarlet-brown), and the base and upper edge of the shell are obliquely streaked with the same colour; the latter part in such a manner as to leave a neat spiral necklace of short streaks upon the surface of the spire. In some specimens the articulated fillets are more confused, though the necklace of short streaks is still clearly defined around the edge of the spire.

Conus mahogani. *Con. testâ elongato-turbinatâ, subcylindraceâ, basim versus sulcatâ; albidâ, spadiceo profusè tinctâ, tæniis frequentibus spadiceo alboque articulatis cinctâ; spirâ valdè elatâ; aperturæ fauce albâ.*

Conch. Icon., *Conus*, pl. 22. f. 126.

Hab. Salango, West Columbia (found in sandy mud); Cuming.

This species differs from the *Conus interruptus* in having the spire narrower and much more elevated; it is always more strongly and fully stained with the dark reddish-brown, and the interior of the shell exhibits no indication of any purple.

Conus intermedius. *Con. testâ elongato-turbinatâ, subcylindraceâ, lævi, columellâ basim versus subtiliter sulcatâ; puniceo-roseâ, maculis grandibus fuscescentibus reticulatis, interruptè bibalteatâ, interstitiis plus minusve pallidè reticulatis; spirâ convexo-elatâ, spiraliter striatâ; aperturâ patente, fauce pallidè violaceâ.*

Conch. Icon., *Conus*, pl. 23. f. 129; *Conus geographus, var.*, Broderip; Sowerby, Conch. Illus., f. 33.

Hab. Island of Annaa, Pacific Ocean (found on the reefs); Cuming.

I have long suspected this shell to be distinct from the *Conus geographus*; it differs constantly in form, in colour, and in the general distribution of the brown reticulated painting. These differences are unimportant however compared with a character which it has in common with the *Conus tulipa*, namely that of having the lower portion delicately grooved. The base of the *Conus geographus* does not present the slightest indication of this grooving, nor indeed any inequality of surface beyond the ordinary striæ of growth, which pass in the contrary direction. I notice this character in the *Conus intermedius* merely to show that it cannot be a variety of the *Conus geographus*; the grooving must not be regarded as a specific peculiarity, because, as already observed, it is common to the *Conus tulipa*, as well as to another closely allied species, the *Conus obscurus*.

Conus orbitatus. *Con. testâ oblongo-turbinatâ, tenuiculâ, transversim liratâ, liris planis, interstitiis striato-pertusis; albidâ, ustulato-fusco variegatâ; spirâ acuminatâ, apice elato, acuto.*

Conch. Icon., *Conus*, pl. 27. fig. 156.

Hab. ——?

I kindly thank M. Deshayes for the use of this interesting little shell, which at first sight I thought to be a young specimen of the *Conus sulcatus*.

Conus elongatus. *Con. testâ elongato-turbinatâ, lævi, luteo-olivaceâ, supernè cæruleo-albâ, fasciâ interruptâ subindistinctâ deorsum cingulatâ; spirâ convexâ, cæruleo-albâ, subtilissimè coronatâ, apice rosaceo; basi et aperturæ fauce vividè violaceis.*

Conch. Icon., *Conus*, pl. 27. f. 157.

Hab. ——?

I adopt the Rev. Mr. Stainforth's manuscript name for this elegant little shell, believing that it may with great propriety be regarded as a new species.

Conus iodostoma. *Con. testâ subelongato-turbinatâ, tenui, leviter inflatâ; albidâ, purpureo pallidissimè tinctâ, luteo-fuscescente sparsim et irregulariter punctatâ et maculatâ; spirâ subtilissimè sulcatâ, apice elato, acuto; aperturâ latiusculâ, fauce violaceo-purpureâ.*

Conch. Icon., *Conus*, pl. 28. f. 159.

Hab. ——?

This shell has been supposed to have some considerable affinity with the *Conus Janus*; it does not however, in my opinion, exhibit any characters in common with that species, and may at once be distinguished by its tenuity, by its spotted peculiarity of painting, and by its violet-stained mouth.

Conus inscriptus. *Con. testâ turbinatâ, solidiusculâ, lævi, basim versus sulcatâ, sulcis latis, striatis; cæruleo-albidâ, maculis grandibus fuscescentibus, literis Sinensibus simillimis, trifasciatim inscriptâ, interstitiis macularum minorum serie unicâ cingulatis; spirâ mediocri, spiraliter striatâ, fuscescente variegatâ, apice acuto; aperturæ fauce violaceo-carneolatâ.*

Conch. Icon., *Conus*, pl. 29. f. 164; *Conus leo scandens*? Chemnitz, Conch. Cab., vol. x. pl. 140. f. 1300.

Hab. ——?

This appears to me to be a well-characterized species, and clearly distinct from that variety of the *Conus Proteus* to which it so closely approximates in the style of painting. I much question whether the figure described by Chemnitz under the title of "*Leo scandens*," from an imagined resemblance of the hieroglyphical spots to the common heraldic device of the climbing lion, is not a representation of this shell, and that Lamarck, Pfeiffer, and others have somewhat erred in quoting it as the well-known similarly marked variety of *C. Proteus*.

Conus bulbus. *Con. testâ subobeso-turbinatâ, solidâ, supernè rotundatâ; albâ, fusco longitudinaliter strigatâ, strigis irregularibus, obliquè undulatis, supernè et infernè diffusis; spirâ brevi, apice mucronato.*

Var. β. *Testa omninò fusca.*

Conch. Icon., *Conus*, pl. 30. f. 169.

Hab. Cabenda, west coast of Africa (found at the depth of five fathoms in soft mud, washed down by the waters of the Congo); Hankey.

Four specimens of this very interesting species were collected at the above-named locality by Lieut. Hankey. It is a very solid shell, having the appearance of a small bulb-root.

Conus aplustre. *Con. testâ subobeso-turbinatâ, tenui, subinflatâ, lævi, basim versus liratâ; rubido-fusco et cæruleo pallidè et subirregulariter zonatâ, tæniis fusco-articulatis angustis numerosis subtilibus ornatâ; spirâ depresso-convexâ, apice mucronato.*

Conch. Icon., *Conus*, pl. 30. f. 170.

Hab. ——?

This is another new species, and will be recognised as being very distinct from any hitherto described.

Conus Metcalfii. *Con. testâ elongato-ovatâ, per totam superficiem granulosâ, granulis subtilibus, seriatim digestis; albidâ, aurantio-fusco irregulariter inquinatâ, balteâ albidâ angustâ in medio cingulatâ; spirâ subexsertâ, aurantio-fusco maculatâ, apice acuminato.*

Conch. Icon., *Conus*, pl. 36. f. 192.

Hab. ——?

I have much pleasure in naming this interesting species, at the desire of the Rev. Mr. Stainforth, in honour of William Metcalfe, Esq., a gentleman whose zeal for collecting and identifying the more minute and less attractive species of shells is highly serviceable to science.

Conus Victoriæ. *Con. testâ ovato-turbinatâ, tenui, subinflatâ, transversim striatâ; albidâ, cæsio longitudinaliter inquinatâ, maculis grandibus, subsolitariis, aurantiis, fusco undulato-virgatis, trifasciatim ornatâ, interstitiis aurantio-fusco subtilissimè reticulatis; spirâ elevato-exsertâ, apice acutissimo; aperturâ latiusculâ, fauce pallidè cæsiâ.*

Var. β. *Testa maculis aurantiis majoribus, trifasciatim coalescentibus; strigis fuscis longitudinalibus prominentioribus.*

Conch. Icon., *Conus*, pl. 37. f. 202.

Hab. Mouth of the Victoria River, New Holland; H.M.S. *Beagle*.

This highly interesting species must be seen to be appreciated, it being quite impossible to do justice either by drawing or description to its elaborate configuration. It is perhaps next allied to the *Conus canonicus*, but is of much lighter and more inflated growth; the three rows of brown-striped orange blotches are peculiar to it; the net-work is finer, and of a much more delicate and tremulous character, and the interior of the aperture, instead of being pink, is of the same greyish blue colour which characterizes the outer surface.

I take the liberty of attaching Her Majesty's name to this beautiful shell, from the circumstance of its having been lately discovered in a locality dedicated in like manner to the same fair patroness of the sciences.

The two specimens here figured, recently in my possession, were collected during the late surveying expedition of H.M.S. *Beagle*. Mr. Cuming and the Rev. Mr. Stainforth each possess several examples.

Conus scalptus. *Con. testâ turbinatâ, solidiusculâ, politâ, basim versus sulcatâ; albidâ, filis rubidis numerosis, rariter interruptis, cinctâ; spirâ elevatâ, spiraliter striatâ, rubro variegatâ, apice acuto.*

Conch. Icon., *Conus*, pl. 37. f. 203.

Hab. —— ?

This is a new and very distinct species; the transverse lines exhibit the appearance of scratches and are very characteristic. M. Chenu of Paris proposed describing this shell under the title of *C. radiatus*, but that name has been applied to another species by Gmelin, though not acknowledged.

Conus mucronatus. *Con. testâ acuminato-turbinatâ, basim versus attenuatâ, transversim sulcatâ, sulcis striis longitudinalibus cancellatis; albidâ, fusco pallidè tinctâ et variegatâ; spirâ elato-exsertâ, fusco pallidè maculatâ, apice mucronato, acuto.*

Conch. Icon., *Conus*, pl. 37. f. 204.

Hab. Islands of Burias, Siquijor, Penay, &c., Philippines; Cuming.

Several examples of this species have been collected by Mr. Cuming, varying remarkably in their general appearance; most of them are obsoletely coronated, and all have the grooves more or less strongly developed, with the apex remarkably sharp-pointed. *Coni sulcatus* and *orbitatus* are the nearest allied species.

Conus cuneolus. *Con. testâ abbreviato-turbinatâ, supernè obesâ, subinflatâ; fuscâ, maculis albidis paucis parvis, irregularibus, subtrigonis, fasciatim aspersâ, fasciâ albidâ, fusco pallidè strigatâ, interdum subobsoletâ, infra medium ornatâ; spirâ convexo-obtusâ.*

Conch. Icon., *Conus*, pl. 37. f. 205.

Hab. ——?

This apparently variable species approximates in some degree to the *Conus mercator*.

Conus verriculum. *Con. testâ cylindraceo-turbinatâ, ventricosâ, subrotundatâ, lævi, basim versus striatâ; albidâ, maculis aurantiis irregularibus bifasciatim cinctâ, aurantio-fusco aliter latissimè reticulatâ; maculis lineis undulatis nunc transversim, nunc longitudinaliter strigatis; spirâ concavo-acuminatâ.*

Conch. Icon., *Conus*, pl. 38. f. 208.

Conus textile, var. *l*, Lamarck.

Hab. Ceylon, &c.

Many persons will no doubt cavil at my attaching a new specific name to this long-established variety of the *Conus textile*, but how can Lamarck's *Conus vicarius* stand, unless this shell be elevated to the same rank? Its inflated growth and the wide open character of the net-work are somewhat constant, and it may as well be noticed that the *Conus verriculum* has long been erroneously set apart by collectors for the *Conus archiepiscopus*, a very different shell, and one of much greater rarity. Either the *Conus verriculum* must be adopted, or the *Conus vicarius* must be rejected, and both considered as varieties of the *Conus textile*.

There can be no law for the adjudication of species, whilst a species remains to be defined. If the *Coni vicarius* and *verriculum* be discarded, hundreds of species may be banished in like manner from the nomenclature, as the links in the grand chain of affinity between the *Aspergillum* and the *Argonaut* become gradually revealed to observation.

Conus Martinianus. *Con. testâ cylindraceo-turbinatâ, fuscâ, vel luteolo-fuscâ, ad basim, et per spiræ marginem, albidâ; lævi, infrà medium sulcatâ, sulcis latiusculis, subdistantibus, striis prominentibus, cancellatis; spirâ convexâ, spiraliter sulcatâ, sulcis numerosis, angustis, apice elato, acuto.*

Conch. Icon., *Conus*, pl. 40. f. 217.

Conus teres lævis, Martini, Conch. Cab., vol. ii. p. 233. pl. 53. f. 584; *Conus lacteus, var.*? Lamarck.

Hab. Putao, province of Albay, island of Luzon, Philippines (found under stones at low water); Cuming.

This species has been either injudiciously confounded by Lamarck

with the *Conus lacteus*, or it has been altogether neglected. Martini has given a very accurate figure of it, but his irregular style of nomenclature precludes the possibility of our following the title by which he distinguished it. The *Conus spectrum* is described by that author under the name of *Conus teres*, and this immediately follows under that of *Conus teres lævis*; the former is however a shell of a more inflated growth, and distinguished moreover by markings of which the *Conus Martinianus* is entirely destitute. Most specimens exhibit a longitudinal white streak here and there, running parallel with the lines of growth.

Conus incarnatus. *Con. testâ turbinatâ, vix pyriformi, basim versus subtilissimè liratâ, liris numerosis, confertis; albâ, fasciis duabus latissimis, pallidè incarnatis, cinctâ; spirâ convexiusculâ, spiraliter incisâ, maculis incarnatis arcuatis pallidè variegatâ, apice mucronato, elato.*

Conch. Icon., *Conus*, pl. 41. f. 221.

Hab. Malacca (found on mud-banks); Cuming.

Although the specimen above described is in the best state of preservation, I should have judged it, from its simple style of colouring, to be a shell of immature growth, were it not that Mr. Cuming collected several specimens of them at Malacca on the mud-banks, all exhibiting the same uniformity of external character.

Conus bæticus. *Con. testâ turbinatâ, solidiusculâ, lævi, basim versus granulosâ; albâ, punctis maculisque grandibus, bæticis, vividè pictâ; spirâ subobtuso-convexâ, obsoletè coronatâ, spiraliter sulcatâ, sulcis striato-cancellatis.*

Conch. Icon., *Conus*, pl. 42. f. 226.

Hab. Philippine Islands; Cuming.

The *Conicus bæticus* exhibits no other colour but that of the dots and blotches, which are of very dark chocolate-brown upon a white ground.

Conus epistomium. *Con. testâ elongato-turbinatâ, rectâ, tenuiculâ, albâ, maculis aurantio-fuscis, peculiariter fluentibus, bifasciatim cinctâ, maculis albo subobsoletè transversim punctato-lineatis; spirâ depressiusculâ, fuscescente maculatâ.*

Conch. Icon., *Conus*, pl. 42. f. 227.

Hab. Mauritius.

This shell is of a peculiarly straight form, and reminds one very forcibly of the spigot or faucet-stop of a barrel; the very faint white dotted transverse lines are exceedingly regular, and of quite a different character to those of the brocade species.

Conus cocceus. *Con. testâ turbinatâ, supernè obesiusculâ, subrotundatâ, transversim subtilissimè liratâ, interstitiis leviter pertusis; albâ, liris maculis parvis irregularibus, pallidè cocceis, eximiè tæniatis; spirâ obtuso-convexâ.*

Conch. Icon., *Conus*, pl. 42. f. 228.

Hab. New Holland.

Mr. Cuming possesses three specimens of this delicately marked Cone, the entire surface of which is covered with faintly articulated fillets of white and scarlet.

Conus Clerii. *Con. testâ turbinatâ, supernè acutanguld, tenuiculâ, per totam superficiem subtilissimè liratâ; albâ, strigis fuscescentibus, longitudinaliter undatis, subirregulariter variegatâ; spirâ depressiusculâ, leviter canaliculatâ, apice elato, mucronato.*

Conch. Icon., *Conus*, pl. 43. f. 229.

Hab. Cape St. Thomas, Brazils (found in sandy mud at the depth of thirty-five fathoms); Clery.

I have much pleasure in adopting the name of an intelligent French naval commander, to whom we are indebted for this, and many new and interesting species of shells.

Conus piperatus. *Con. testâ subabbreviato-turbinatâ, basim versùs sulcatâ; albâ, maculis fuscis parvis sparsis irregulariter ornatâ; spirâ convexâ, spiraliter striatâ, apice mucronato, elato; aperturæ fauce fuscescente tinctâ.*

Conch. Icon., *Conus*, pl. 43. f. 230. *Hab.* —— ?

The *Conus erythræensis* is perhaps the nearest allied species to this, well characterized by the stained interior, and the more dotted style of the external painting.

Conus Grüneri. *Con. testâ turbinatâ, supernè lævi, infrà transversim sulcatâ, sulcis prominentibus; albâ, maculis subquadratis rubris trifasciatim tæniatâ, intervallis punctis rubris minutissimis aspersis; spirâ depresso-planâ, spiraliter canaliculatâ, basi intus extusque nigricante-violaceo tinctâ.*

Conch. Icon., *Conus*, pl. 43. f. 231.

Hab. Island of Java.

This is a beautiful little species, very distinct from any hitherto described. At the request of Mr. Cuming I have named it after M. Grüner of Bremen, a very zealous collector, whom I thank most cordially, not only for the loan of the shell, but for setting an example which I trust continental amateurs will not fail to profit by.

There is another specimen, of rather larger size, in the cabinet of Mr. J. E. Gray of the British Museum.

Conus sindon. *Con. testâ subventricoso-turbinatâ, lævissculâ; albidâ, lineis rubido-fuscis subtilissimis densissimè bifasciatim decussatâ; spirâ subobtuso-convexâ, apice rosaceo.*

Conch. Icon., *Conus*, pl. 43. f. 233.

Hab. —— ?

This interesting shell, for the loan of which I am indebted to the zeal of Mr. Adamson of Newcastle, is very distinct from any hitherto described species. The painting viewed through an ordinary lens suggests the appearance of very fine lawn or cambric linen, and is of a quite novel character.

Conus Parius. *Con. testâ turbinatâ, solidâ, supernè obesâ, basim versus sulcatâ, sulcis distantibus latiusculis, densissimè striato-cancellatis; marmoreo-albâ; spirâ plano-convexâ, lævi, apice mucronato, fuscescente.*

Conch. Icon., *Conus*, pl. 43. f. 235.

Conus spectrum album, Chemnitz, Conch. Cab., vol. x. pl. 140. f. 1304; *Conus columba, var. c*, Lamarck, Enc. Méth., pl. 331. f. 3.

Hab. —— ?

This shell, which is of a solid, shining white (like the celebrated marble of Paros), has been evidently confounded with the *Conus columba*; it requires however no very great exercise of critical discrimination to perceive that it differs materially both from that and the preceding species.

Conus exaratus. *Con. testâ turbinatâ, subangustâ, per totam superficiem sulcatâ, sulcis regularibus, latiusculis, interstitiis subtilissimè striato-cancellatis; pallidè cæruleo-purpureâ, maculis ferruginosis albinubeculatis, perpaucis, parcis, sparsim ornatâ; spirâ acuminatâ.*

Conch. Icon., *Conus*, pl. 44. f. 238.

Hab. ——?

This is a very distinct species, remarkable for the regularity with which it is grooved.

Conus ustulatus. *Con. testâ subelongato-turbinatâ, supernè tumidiusculâ, margine rotundatâ, transversim subtilissimè liratâ; pallidè ustulato-rubidâ, balteâ albidâ angustâ in medio cinctâ; spirâ convexâ, spiraliter striatâ, maculis perpaucis sparsis purpureo-rubris ad marginem superiorem ornatâ; apice mucronato.*

Conch. Icon., *Conus*, pl. 44. f. 239.

Hab. New Holland.

There is no trace of any purple-red spots or other dark character on the body of the shell.

Conus aculeiformis. *Con. testâ elongato-turbinatâ, subfusiformi, undique sulcatâ, sulcis subtilissimè striato-cancellatis, nunc angustis, liris intermediis planis latiusculis, nunc latioribus, liris intermediis rotundatis angustis; albidâ, fuscescente punctatâ, maculis fuscescentibus biseriatim cinctâ; spirâ acuminatâ, apice elato, acuto.*

Conch. Icon., *Conus*, pl. 44. f. 240.

Hab. Cagayan, island of Mindanao, Philippines (dredged from sandy mud at the depth of from twenty-five to thirty fathoms); Cuming.

The specimens collected by Mr. Cuming at the above-mentioned island are mostly smaller than those here figured.

Conus violaceus. *Con. testâ elongato-turbinatâ, cylindraceâ, tenui, nitidâ; violaceâ, transversim obsoletè fuscescente punctato-lineatâ, fuscescente longitudinaliter strigatâ, aut sparsim maculatâ; strigis subdistantibus, lineis brevibus fuscescentibus, exiliter albiarticulatis, ornatis; spirâ rotundato-obtusâ, spiraliter striatâ.*

Conch. Icon., *Conus*, pl. 44. f. 241.

Hab. Matnog, island of Luzon, Philippines (found on the reefs); Cuming.

This is a very interesting species; the faint dotted lines with which the entire shell is encircled are scarcely visible on the violet ground without the assistance of an ordinary lens, but in passing over the longitudinal streaks of light brown they present a more decided appearance.

Conus tabidus. *Con. testâ turbinatâ, leviter pyriformi, tenui, un-*

dique sulcatâ, sulcis basalibus latioribus, profundis, alteris irregularibus, subtilissimis, undulatis; albâ, totâ superficie striis longitudinalibus elevatis peculiariter sculptâ; spirâ subobtuso-convexâ obsoletè coronatâ.

Conch. Icon., *Conus*, pl. 44. f. 243.

Hab. —— ?

I am not aware that the raised longitudinal striæ with which this shell is so delicately sculptured are to be found in any other species of the genus.

Conus ambiguus. *Con. testâ turbinatâ, lævi, basim versus liratâ, lineis subtilissimis, undatis, longitudinalibus, subobsoletè incisis; albâ, pallidè fuscescente tinctâ; spirâ obtuso-convexâ, leviter canaliculatâ, maculis arcuatis fuscescentibus ornatâ, apice mucronato, elato.*

Conch. Icon., *Conus*, pl. 44. f. 244.

Hab. —— ?

There is always a doubtful character about shells exhibiting faint indications of colour; I have not, however, succeeded in referring this to any species hitherto described.

Conus lentiginosus. *Con. testâ fusiformi-turbinatâ, tenuiculâ, lævi, basim versus sulcatâ, sulcis latiusculis, profundis; albidâ, fuscescente lentiginosâ et punctatâ; spirâ elatâ, anfractibus acut-angulis, marginibus fuscescente maculatis, maculis subdistantibus; labro subexpanso, juxta spiram emarginato.*

Conch. Icon., *Conus*, pl. 44. f. 245.

Hab. —— ?

This is an interesting and important species, of which there is a fainter specimen, of more elongated growth, in the collection of Mr. Adamson of Newcastle.

Conus trochulus. *Con. testâ abbreviato-turbinatâ, obesâ, solidâ, lævigatâ, basim versus sulcatâ; albâ, aperturæ fauce rubido-violaceo tinctâ; spirâ obtuso-convexâ, lævigatâ.*

Conch. Icon., *Conus*, pl. 45. f. 246.

Hab. —— ?

This species, of which there are several examples in the British Museum, all with the violet-tinged aperture, exhibits the same contrast of colour as a very peculiar white variety of the *Conus nivosus*.

Conus sugillatus. *Con. testâ turbinatâ, solidiusculâ, lævigatâ, basim versus subobsoletè noduloso-liratâ; albidâ, fasciis duabus latissimis livido-olivaceis, lineisque exilibus fuscescente-punctatis, cinctâ; spirâ plano-convexâ, canaliculatâ, apice mucronato, elato, anfractuum marginibus subtilissimè obliquè nodulosis; basi et aperturæ fauce violaceo tinctâ.*

Conch. Icon., *Conus*, pl. 45. f. 247.

Hab. —— ?

This shell may probably have been confounded with the *Conus lividus*; it is, however, quite distinct from that species both in the detail of the painting and in the structure of the spire. The spire is canaliculated, and very peculiarly beaded with fine oblique nodules,

the canaliculated surface being of an olive-brown colour, whilst the nodules are white.

Conus suturatus. *Con. testâ subabbreviato-turbinatâ, solidiusculâ, lævigatâ, basim versus sulcatâ, sulcis latiusculis, distantibus; albâ, basi pallidè rosaceâ; spirâ plano-convexâ, profundè suturatâ, spiraliter liratâ et striatâ, apice minuto, acuto.*

Conch. Icon., *Conus*, pl. 45. f. 250.

Hab. —— ?

There is a very peculiar character on the spire of this shell; the sutures have an unusually decided appearance, in consequence of a small ridge which each whorl throws up at its junction with the preceding.

Conus crepusculum. *Con. testâ turbinatâ, tenuiculâ, supernè lævi, infrà exiliter granulatâ, granulis seriatim digestis, basim versus gradatim majoribus; luteolâ, basi violaceâ; spirâ convexâ, apice mucronato, elato, anfractuum marginibus subtilissimè obsoletè nodulosis.*

Conch. Icon., *Conus*, pl. 45. f. 251.

Hab. —— ?

This shell is allied in some measure to the *Conus lividus*; it is, however, of much lighter growth, there is no indication of any colour in the aperture, and the spire is obsoletely very finely beaded.

Conus tristis. *Con. testâ turbinatâ, subfusiformi, lævigatâ, basim versus sulcatâ; albâ; spirâ convexo-elatâ, spiraliter striatâ, anfractuum marginibus subtilissimè nodulosis, anfractûs ultimi nodulis obsoletis, apice mucronato.*

Conch. Icon. *Conus*, pl. 45. f. 252.

Hab. —— ?

There is no indication of any colour in this shell; it is of rather light structure.

Conus plumbeus. *Con. testâ turbinatâ, subpyriformi, irregulariter rugulosâ et granosâ, cæruleo-albâ, olivaceo- aut violaceo-plumbeo fasciatâ et strigatâ; spirâ convexâ, nodulis subtilibus coronatâ, albâ, apice obtuso, rosaceo; basi et aperturæ fauce vividè violaceâ.*

Conch. Icon., *Conus*, pl. 46. f. 253.

Hab. —— ?

The wrinkles and irregular granules which cover the greater portion of this specimen may not belong to the species, which is introduced upon independent grounds; namely, on account of the cross-blotched style of painting characteristically exhibited on the under side of the shell, the deep violet lining of the aperture, and the rose-tinted apex upon a neatly coronated white spire.

Conus Broderipii. *Con. testâ tenuiculâ, subinflatâ, transversim sulcatâ, sulcis basim versus distinctioribus, subtilissimè pertusis; pallidissimè incarnato-albâ, maculis aurantio-fuscescentibus inter sulcos ornatâ; spirâ planiusculâ, spiraliter sulcatâ, apice elato, mucronato; basi et aperturæ fauce pallidè incarnato-rosea.*

Conch. Icon., *Conus*, pl. 46. f. 254.

Hab. —— ?

I have much pleasure in dedicating this very chaste and beautiful species to W. J. Broderip, Esq., F.R.S., a gentleman well known in the conchological world, to whose zeal the country is much indebted for this and many other valuable shells which adorn our national collection.

Conus lautus. *Con. testâ turbinatâ, tenuiculâ, lævigatâ; luteâ, punctis grandibus fuscis, trifasciatim confusis, seriatim cinctâ; spirâ obtuso-convexâ, strigis fuscis arcuatis ornatâ.*

Conch. Icon., *Conus*, pl. 46. f. 255.

Hab. —— ?

I am unable to connect this with any hitherto described species; it exhibits a bright display of colour, and must be a striking shell in finer condition.

Conus æmulus. *Con. testâ turbinatâ, supernè tumidiusculâ, lævigatâ, olivaceo-cæruleâ, olivaceo-fusco variegatâ, tæniatâ, et maculatâ; spirâ subobtuso-elatâ, suturis rudibus; aperturæ fauce olivaceo-fusco tinctâ.*

Conch. Icon., *Conus*, pl. 46. f. 256.

Hab. —— ?

This is another very richly coloured shell allied in some measure to the *Conus Guinaicus*, but presenting a very different style of painting.

Conus Grayi. *Con. testâ turbinatâ, supernè obesâ, subpyriformi, solidâ, lævigatâ, basim versus liratâ; cæsiâ, aut cinereo-cæruleâ, maculis grandibus nigricantibus, undatis, sæpissimè bifasciatim digestis, ornatâ; spirâ convexâ, apice mucronato.*

Conch. Icon., *Conus*, pl. 46. f. 258.

Hab. —— ?

As our national Museum is indebted to Mr. Gray for this very interesting new species, I have much pleasure in naming it after him.

Conus minutus. *Con. testâ oblongo-turbinatâ, pyramidali, lævigatâ; incarnatâ, fasciis duabus rubidis latissimis cinctâ; spirâ elatâ, anfractuum marginibus rubido-fusco maculatis.*

Conch. Icon., *Conus*, pl. 47. f. 259.

Hab. Island of St. Vincent, West Indies; Guilding.

This is the smallest species of the genus, and quite peculiar in its characters.

Conus pygmæus. *Con. testâ subabbreviato-turbinatâ, lævi, infernè sulcatâ, sulcis prominentibus, subdistantibus; pallidè violaceo-albâ, strigis fuscis longitudinalibus, latis, undatis, punctorumque seriebus transversis ornatâ; spirâ quasi gradatim elatâ, lævi; aperturæ fauce rubido-violaceâ.*

Conch. Icon., *Conus*, pl. 47. f. 260.

Hab. —— ?

The dark zigzag streaks in this little shell pass over the edges of the whorls, leaving their ends visible on the spire.

Conus conspersus. *Con. testâ turbinatâ, leviter inflatâ, lævi, basim versus sulcatâ; pallidè luteolâ, maculis aurantio-fuscis variisque*

irregulariter conspersis, lineis capillaribus confertis, undique cinctâ; spirâ convexâ, aurantio-fusco maculatâ.

Conch. Icon., *Conus*, pl. 47. f. 262.

Hab. —— ?

This species may be recognized by the fine hair lines with which its entire surface is ornamented.

Conus attenuatus. *Con. testâ gracilè turbinatâ, basim versus attenuatâ, lævi; luteâ vel aurantio-fuscescente, strigis albidis perpaucis latis undatis longitudinaliter ornatâ; spirâ depressâ, acutanguld, aurantio-fuscescente alboque tessellatâ, apice acutissimo, elato.*

Conch. Icon., *Conus*, pl. 47. f. 263.

Hab. —— ?

The long, slender, sugar-loaf form of this shell is rather peculiar, and it exhibits a style of painting which I do not remember to have observed in varieties of any other species.

Conus buxeus. *Con. testâ elongato-turbinatâ, subcylindraceâ, lævi, basim versus subtiliter liratâ; luteo-fuscescente, filis fusco-punctatis numerosis, confertis, cinctâ; spirâ elatâ, anfractuum marginibus subtilissimè nodulosis, apice mucronato.*

Conch. Icon., *Conus*, pl. 47. f. 265.

Hab. —— ?

The *Conus buxeus* is very closely allied to the *Conus lignarius*; it differs chiefly in being of a more elongated or fusiform shape, whilst the spire is distinctly beaded and not canaliculated.

Conus nitidus. *Con. testâ turbinatâ, lævi, nitidâ, prope basim subtilissimè liratâ; aurantio-fuscescente, supernè et medianè exiliter albimaculatâ, lineis fuscis interruptis subdistantibus undique cinctâ; spirâ subelatâ, spiraliter striatâ, apice pallidè rosaceo.*

Conch. Icon., *Conus*, pl. 47. f. 266.

Hab. —— ?

The lines which encircle the entire surface of this delicate little Cone are more particularly interrupted in passing over the faint spots round the middle and upper part of the shell. The pink apex is very characteristic.

Conus castus. *Con. testâ turbinatâ, subinflatâ, lævi; luteâ, lineis perpaucis exilibus, subtilissimè nigricante-punctatis, irregulariter distantibus, cinctâ; spirâ lævi, apice rosaceo.*

Conch. Icon., *Conus*, pl. 47. f. 267.

Hab. —— ?

This is another very chaste and characteristic species, allied to the *Conus daucus*.

Conus liratus. *Con. testâ subabbreviato-turbinatâ, liris subprominulis undique circumdatâ; albidâ, maculis paucis aurantio-fuscis longitudinaliter confluentibus biseriatim cinctâ; spirâ exsertâ, noduliferâ, apice pallidè rosaceo; basi et aperturæ fauce vividè violaceo-roseâ.*

Conch. Icon., *Conus*, pl. 47. f. 268.

Hab. —— ?

A very curious well-marked species, in excellent condition, which, I believe, is at present unique in the unrivalled Cone-collection of the Rev. F. J. Stainforth.

LINNÆAN SOCIETY.

May 7, 1844.—E. Forster, Esq., V.P., in the Chair.

M. Louis Agassiz, Professor of Natural History at Neufchatel, and Dr. M. J. Schleiden, Professor of Botany in the University of Jena, were elected Foreign Members.

Read "Descriptions of the Insects collected by Capt. P. P. King, R.N., F.R.S., F.L.S. &c., in the Survey of the Straits of Magellan." By John Curtis, Esq., F.L.S. &c., in continuation of a paper printed in vol. xviii. of the Transactions of the Society.

The present paper, like the former, is devoted to *Coleoptera*, and the following are the new genera and species characterized in it :—

Fam. Histeridæ.

Hister Mathewsii, violaceo-ater, capite thoracis margine elytrisque punctulatis nisi in elytrorum disco ubi maculæ 2 magnæ violaceæ striæque tres basales breves. Long. 1⅜ lin.; lat. 1⅛.

Hister furcatus, nitidè virescenti-niger, thoracis lateribus brevi-canaliculatis punctulatis, elytris striâ suturali curvatâ basali tribusque costam versus apicem haud attingentibus. Long. 1⅜ lin.; lat. 1⅛.

Hister castaneus, lævis niger, thoracis lateribus punctulatis, elytris pedibusque castaneis; illis striâ suturali furcatâ duabus aliis æquilongis alterâque humerali breviore. Long. 1⅜ lin.; lat. 1¼.

Fam. Hydrophilidæ.

Hydrophilus chalybeatus, intensè nitidè cæruleus, elytris lineis tribus punctulorum remotorum piliferorum, palpis antennisque ochreis apice nigris, pedibus subcastaneis; femoribus piceis. Long. 6 lin.; lat. 3.

Hydrophilus ochripes, palpis antennis labroque basi ochreis apice nigrescentibus, pedibus thoracis margine inferiore sternoque ferrugineo-ochraceis. Long. 4 lin.; lat. 2¼.

Fam. Scarabæidæ.

Sect. Coprophagæ.

Copris semisquamosa, nigra, clypeo magno bidentato cornu brevi emarginato armato, thorace brevi anticè irregulariter truncato, elytris profundè striatis. Long. 10½ lin.; lat. 6.

Copris punctatissima, nigra, clypeo emarginato haud tuberculato, thorace magno punctatissimo tuberculato parvo anticè armato, elytris profundè punctato-striatis. Long. 8 lin.; lat. 4¾.

Sect. Geotrupidæ vel Arenicolæ.

Acanthocerus muricatus, niger, punctulatus, elytris punctato-striatis apice tuberculatis. Long. 1⅜ lin.; lat. 1¼.

Sphærosomus muricatus, *Kirby MSS.*

Sect. Trogidæ.

Trox bullatus, niger cinereo mixtus, thorace inæquali: angulis posticis sublobatis, elytris tuberculis minutis conspersis lineisque tuberculorum magnorum tribus parvorumque pluribus notatis. Long. 7⅛ lin.; lat. 5.

Trox lachrymosus, cinereus nigro mixtus, thorace parvo inæquali, elytris amplis elongato-ovatis punctato-striatis lineis tuberculorum magnorum 4 parvorum 5 notatis. Long. 5—6 lin.; lat. 3—4.

Trox trisulcatus, cinerascenti-niger, capite lævi, thoracis sulcis 3 latis longitudinalibus, elytris striatis: intervallis fasciculatis. Long. 2½—3 lin.; lat. 1⅓—1½.

Sect. Scarabæidæ vel Xylophilæ.

Oryctomorphus pictus (Waterh.), piceus, clypeo bidentato, fronte tuberculato, thorace impressione centrali, elytrorum areâ scutellum cingente strigâque in singulo obliquâ undulatâ nitidè ferrugineis. Long. 10 lin.; lat. ultra 5.

Sect. Phyllophagæ.

Gen. Tribostethes, *Curt.*

Palpi iis *Brachystemi* similes, nisi quod maxillares longiores, labiales breves; illorum articulus basalis minutus, 2dus 3tiusque obovato-truncati, hoc breviore, 4tus longus, gracilis, fusiformis, extùs sulco longo exaratus. Antennæ 10-articulatæ; articulus basalis crassus, clavatus; 2dus parvus subglobosus; 3tius ellipticus; tres sequentes oblongi; 7mus cuneiformis; reliqui clavam ellipticam capitis longitudine efformantes. Clypeus integer rotundatus, margine paulùm elevato, suturâ transversali inconspicuâ. Thorax parvus, transversus; scutellum mediocre, cordatum. Elytra thorace latiora, elliptica. Alæ amplæ. Pectus villosissimus, sterno haud producto; pygidio nudo. Pedes longiusculi, haud crassi; tibiæ anteriores angustæ, extùs tridentatæ, reliquæ setosæ suturis ordinariis; tarsi graciles, articulis omnibus subclavatis; ungue simplici.

Tribostethes castaneus, pallidè castaneus, capite thoraceque virescenti vel æneo tinctis. Long. 8 lin.; lat. 4.

Brachygaster castaneus, *Laporte, Cours Compl. d'Hist. Nat.*

Gen. Callichloris, *Dejean.*

Palporum maxillarium articulus penultimus minutus, subglobosus; terminalis crassior, longior, subfusiformis, extùs planus. Antennæ 10-articulatæ; articulus basalis crassus, pyriformis; 2dus subglobosus; 3tius 4tusque oblongi; 5tus brevis; 6tus cyathiformis; 7mus cuneiformis; reliqui clavam gracilem fusiformem efformantes. Labrum transversum, medio paulùm angulatum. Clypeus transversè ovalis, medio fortiter reflexo. Femora gracilia: tibiæ anticæ versus apicem angustatæ, extùs tridentatæ; reliquæ subscabræ, apice pectinatæ, calcaribusque 2 brevibus armatæ: tarsi anteriores articulis 4 basalibus brevibus, 3tio 4toque cyathiformibus; omnium 5to intùs emarginato; ungue longo, gracili, simplici, anteriore maximè inæquali. Sternum haud productum.

Callichloris perelegans, nitidè flavo-virens punctatissimus, elytris punctato-striatis, subtùs pygidioque ferrugineis anticè pilis albidis villosis posticè pubescentiâ concolori vestitis. Long. 7 lin.; lat. 4.

Leucothyreus? spurius, sine nitore fulvus, capite thoraceque minutè punctulatis: hujus angulis posticis acutis, elytris singulis paribus 4 striarum inconspicuarum notatis. Long. 8¼ lin.; lat. 5.

Leucothyreus? antennatus, ochreus, capite castaneo, antennarum clavâ longissimâ. Long. 6 lin.; lat. 3.

Gen. Serioides, *Guér.* Camptorhina, *Kirby nec Schönh.*

Antennæ 9-articulatæ; articulus basalis crassus, pyriformis; 2dus obo-

vatus; 3tius longior, gracilior; 4tus gracilis haud 2do longior; reliqui clavam gracilem, tenuiter 5-lamellatam, efformantes. Clypeus rotundatus. Labrum emarginatum. Palpi maxillares longi, graciles, 4?-articulati; articulo basali minuto, sequentibus elongatis subæqualibus, terminali truncato: labiales 3-articulati, articulo tertio fusiformi. Caput semiorbiculare. Thorax transversus, basi supra scutellum elongatum emarginatus. Elytra longissima. Pedes longi, graciles: tibiæ anticæ breves, latæ, extùs tridentatæ; reliquæ spinosæ: tarsi similes, longissimi, graciles, setosi; articulis subæqualibus: ungues omnes simplices, longi, graciles.

Serioides atricapillus, elongatus, violaceo-brunneus, punctulatus, elytris rugosis lineatis. Long. 6 lin.; lat. 3.

Camptorhina atricapilla, *Kirby*.

Serioides Reichii, *Guér. Rev. Zool.* 1839, p. 301?

Gen. Athlia, *Erichs.*

Palpi maxillares parvi, setosi, 4-articulati; articulo basali minuto, 2do elongato-clavato; 3tio obovato-truncato; 4to longitudine primi subsecuriformi. Antennæ minimæ, 9-articulatæ; articulo basali crasso, clavato; 2do 3tioque obovatis, illo crassiore; 4to brevi; 5to 6toque cyathiformibus; reliquis clavam minutam, lobis crassis cyathiformibus, efformantibus. Clypeus reflexus, anticè paulùm angustatus, utrinque emarginatus. Caput latiusculum. Thorax transversus, convexus, lateribus convexis, basi parùm sinuatus, angulis anticis magis acuminatis: scutellum parvum ovatum. Elytra thorace multò latiora terque longiora, abdomen operientia, posticè latiora rotundata. Alæ amplæ. Pedes longi, haud graciles: tibiæ anteriores profundè emarginatæ tridentatæ; reliquæ setosæ: tarsi longissimi, subtùs pubescentes; anteriores crassiores: ungues omnium bifidi.

Athlia rustica (Erichs.), castaneus, punctulatus, pubescens, elytris singulis striis 4 elevatis, antennis pedibusque pallidè ferrugineis. Long. 6½ lin.; lat. 3.

Gen. Pacuvia, *Curt.*

Palpi labiales minutissimi: maxillares graciles, 4-articulati; articulo basali minuto; 2do 3tioque ovalibus; 4to multò crassiore, parvo, ovato-lanceolato. Antennæ parvæ, 9-articulatæ; articulus basalis crassus, clavatus; 2dus magnus, globosus; tres sequentes minores, subglobosi, 5tus subcyathiformis; 6tus cuneiformis; reliqui clavam ovalem efformantes. Caput trigono-truncatum. Clypeus reflexus, emarginatus. Thorax transversus, subhexagonus, lateribus prominentibus. Scutellum elongato-trigonum. Elytra thorace latiora, terque longiora, elliptica. Alæ amplæ, Pygidium nudum. Pedes longi, extensi: femora anteriora brevissima; postica crassissima: tibiæ anteriores breves, extùs bispinosæ; reliquæ pilosæ, medio spinosæ: tarsi longissimi, subtùs pubescentes; 4 anteriorum articulo 2do 3tioque dilatatis; omnium articulo basali 2do multò breviore, terminali gracillimo: unguibus longis, gracilibus, bifidis.

Pacuvia castanea, ochrea punctulata, capite thoraceque castaneis, elytris singulis striis 4 duplicatis. Long. 4½ lin.; lat. 2¼.

Gen. Accia, *Curt.*

Palpi nudi: labiales minutissimi; maxillares parvi, 4-articulati; articulo basali minuto; 2do elongato, clavato; 3tio breviori, obovato; 4to omnium maximo, elliptico-truncato. Antennæ parvæ, 9-articulatæ; articuli 2 basales crassi, 1mo pyriformi, 2do globoso-pyriformi; 3tius gracilis, longus; 4tus ovalis; 5tus 6tusque annuliformes; reliqui

clavam tenuem efformantes. Clypeus rotundatus reflexus. Caput mediocre. Thorax transversus, basi sinuatus, margine anteriore excavatus, angulis prominentibus. Scutellum elongato-trigonum. Elytra thorace ferè quater longiora, elliptica, pygidium haud completè operientia. Alæ amplæ. Pedes longi, graciles: femora tibiæque anteriores brevissimæ; hæ latæ, extùs tridentatæ; 4 posteriores spinosæ: tarsi longi, graciles, setosi, haud subtùs pubescentes; articulo basali longitudine 2di: unguibus gracilibus, simplicibus.

Accia lucida, nitidè testacea minutè punctulata, capite ferrugineo, elytris subcupreis striatis. Long. 4¼ lin.; lat. 2.

Colporhina bifoveolata, ferruginea æneo tincta punctulata, squamis albidis in thorace elytrisque maculas efformantibus vestita. Long. 3 lin.; lat. 1⅜.

Macrodactylus marmoratus, subcastaneus pilis albidis vestitus, thoracis disco brunneo lineâ pilorum albidorum centrali, elytris fasciis irregularibus brunneis pubescentiæque albidæ maculis notatis. Long. 3¼ lin.; lat. 1¼.

Fam. Lucanidæ.

Dorcas rufifemoralis, cinereo-niger, capite thoraceque nitidis, elytris densè profundèque punctulatis: punctis ochreo-papillatis, coxis femoribusque rufis. Long. ♂ 10, ♀ 7½ lin.; lat. ♂ 3½, ♀ 3.

Dorcas rufifemoralis, *Guér.*?

HETEROMERA.

Melasoma.

Fam. Pimeliaridæ.

Procris lævicosta, obscurè æneo-nigra, elytrorum margine inferiore haud punctulato, tarsis subferrugineis. Long. 4¼ lin.; lat. 2¾.

Fam. Blapsidæ.

Scotobius bullatus, obscurè niger rugosus latus brevis, capite thoraceque punctatissimis: hujus angulis posticis acutis, elytris punctato-striatis: porcis in intervallis nitidis granulatis ad apicem tubercula distincta efformantibus: seriebus 2 costalibus remotè tuberculatis. Long. 6½ lin.; lat. 3⅓.

Leptynoderus tuberculatus, lutosus, capite trituberculato, thorace tuberculato, elytris porcis 5 acutis e quibus 2 dorsalibus fortioribus. Long. ferè 6 lin.; lat. 2½.

Emalodera multipunctata, nitidè nigra punctatissima, thorace obovato-truncato, elytrorum punctis lineas numerosas duplicatas efformantibus margine extùs apiceque tuberculatis. Long. 5½—6½ lin.; lat. 3—3½.

Nyctelia caudata, nitidè atra, elytris (nisi in areâ suturali) obliquè crassèque sulcatis: apice in caudam semicircularem dilatatis. Long. 8½—13 lin.; lat. 5—7½.

Nyctelia undatipennis, lævis nigra, elytris sulcis 7 brevibus latis transversis in margine exteriore. Long. 8 lin.; lat. ♂ 4⅓, ♀ 5⅓.

Nyctelia Fitzroyi, lævis nigra, elytris hemisphæricis caudatis, antennis pedibusque nitidè ferrugineis. Long. 10 lin.; lat. 7½.

Nyctelia granulata, lævis nigra, elytris latissimis ovatis orbicularibusve rugosissimis: rugis suturam versus lineas longitudinales efformantibus. Long. ♂ 8 lin., ♀ 9; lat. 4½—6.

Nyctelia Bremii, nitidè nigra, elytris suborbicularibus caudatis lineis elevatis suturam versus obliquis ad marginem exteriorem curvatis profundè insculptis. Long. 9 lin.; lat. 5½.

Nyctelia Bremii, *Waterh. in Ann. and Mag. Nat. Hist.* vol. xiii. p. 48.

Nyctelia? corrugata, nitidè nigra, thoracis lateribus rugosis, elytris trans-

versim undulato-canaliculatis: suturâ depressâ bistriatâ. Long. 8½ lin.; lat. 5.

Mitragenius araneiformis, niger, thorace subtilissimè vermiculato prope basin angulato, elytris cinereis cupreo tinctis subscabris nigro-maculatis: singulis porcis 2 ante apicem coalitis. Long. 8¼—9 lin.; lat. 4½—5½.

Epipedonota margineplicata, nigra nitida, thorace concavo in disco longitudinaliter in marginibus transversè striato, elytris porcis 2 exteriore fortiore: intervallo hanc inter marginemque exteriorem regulariter transversè canaliculato. Long. 11 lin.; lat. 6.

Nycterinus rugiceps, obscurè niger, capite punctulato ad basin granulato, thorace lævi, elytris punctato-striatis. Long. 8 lin.; lat. 3.

Taxicornes.

Fam. Diaperidæ.

Oplocephala quadrituberculata, piceo-nitida, trophis antennis pedibus subtùsque ferrugineis, capite 4-tuberculato. Long. 3¼ lin.; lat. 1½.

Alphitobius? punctatus, ellipticus subconvexus, virescenti-niger, punctatissimus, elytris piceo-brunneis striato-punctatis, trophis antennis pedibusque castaneis. Long. 2. lin.; lat. 1.

Epilasium rotundatum (Dej.), ovale, nigrum, punctatissimum, pube pallidè brunneâ vestitum, elytris punctato-striatis. Long. 4 lin.; lat. 2⅔.

Fam. Tenebrionidæ.

Epitragus æneo-brunneus, ferrugineus æneo-tinctus, undique punctatus, capite punctatissimo, elytris minutè striato-punctatis. Long. lin. 4; lat. 1⅔.

Epitragus semicastaneus, castaneus, minutè punctatissimus, capite thoraceque piceis, elytris inconspicuè punctato-striatis. Long. 3½ lin.; lat. 1¾.

Fam. Helopidæ.

Prostenus? hirsutus, nitidè æneus vel cupreus, pilis longis vestitus, punctulatus, antennis nigris, elytris subcastaneis punctato-striatis, femoribus basi rufis. Long. 2½ lin.; lat. 1½.

Fam. Mordellidæ.

Mordella Tachyporiformis, nigra minutè et crebrè punctulata, suprà pube brevi brunneâ vestita. Long. 3 lin.; lat. ultra 1.

Mordella argentipunctata, sericeo-nigra, thoracis margine antico elytrorumque basali maculis 4 aculeisque basalibus argenteo-albis. Long. ferè 2 lin.; lat. ¾.

Fam. Cantharidæ.

Epicauta conspersa (Germ.?), nigra pube cinereâ, punctis nigris minutis sparsim conspersa. Long. 5 lin.; lat. 2.

Tetraonyx 7-guttatus, niger suprà aurantiacus, capitis thoracisque maculâ elytrorum maculis 4 basalibus fasciâque postmedianâ irregulari nigris, femoribus basi rufis. Long. 5½ lin.; lat. 2¼.

Tetraonyx cinctus, nitidè niger pubescens punctulatus, elytris subscabris suturâ margineque exteriore ochraceis. Long. 4 lin.; lat. 1½.

Fam. Œdemeridæ.

Nacerdes? alternans, pallidè ochreus, oculis thoracis lineâ inconspicuâ elytrorumque strigis 2 longis pallidè fuscis. Long. 3¾ lin.; lat. 1.

The paper was accompanied by drawings of many of the new species.

BOTANICAL SOCIETY OF EDINBURGH.

This Society met on Thursday, June 13th, at the Royal Botanic Gardens, Professor Graham, President, in the chair.

1. "On four genera of *Desmidieæ*," by Mr. John Ralfs, Penzance. The genera are *Cosmarium*, *Pediastrum*, *Xanthidium*, and *Scenedesmus*, and the descriptions of them, which were accompanied by illustrative drawings, will shortly appear in the 'Annals and Magazine of Natural History.'

2. "Continuation of Mr. James M'Nab's Journal of a Tour through part of the United States and the Canadas." In the previous part of this Journal, Mr. M'Nab gave a brief outline of the principal botanical and horticultural features observed in the neighbourhood of New York. The part now read embraced chiefly the appearance of the country around Albany, with an account of the most interesting plants seen during the journey thither. Among these the most remarkable were several species of *Lycopodium*, with which the peaty soils on the road-sides around Albany were covered, consisting of *L. complanatum*, *clavatum* and *dendroides*, the latter resembling at a distance young spruce firs, being similarly shaped and of a lively green colour. In damp situations in the close forests, *Adiantum pedatum* and other ferns covered large tracts, while *Pyrola elliptica* and *rotundifolia*, with *Chemophylla maculata* and *umbellata*, were in full flower along the drier parts. *Satyrium herbiola* and *Neottia tortilis* were also observed, the latter growing chiefly in pairs. The principal plants noticed in the meadows or open grounds were *Lilium philadelphicum* and *canadense*, *Mimulus ringens*, *Verbena hastata* and *urticifolia*, and *Asclepias obtusifolia* and *variegata*. Proceeding towards Troy on the banks of the Hudson, great quantities of *Kalmia angustifolia*, *Cornus florida*, *Lupinus perennis*, Andromedas, Vacciniums, &c. occurred. In an extensive forest, chiefly composed of small trees, and much entangled with *Smilax* or green brier, through which the party proceeded with great difficulty, *Cypripedium spectabile* covered large patches, with *Arum triphyllum*, the latter in full flower. Mr. M'Nab concluded the present part of his Journal with an account of some large trees of the hemlock spruce, *Abies canadensis*, being the first of this tree which the party had observed in natural situations; the largest specimens were about 10 feet in circumference and 80 feet in height.

This Society held its last meeting for the session on Thursday July 11th, at the Royal Botanic Garden, Professor Graham in the chair.

The Treasurer read a paper on three genera of *Desmidieæ*, by Mr. John Ralfs, Penzance, viz. *Desmidium*, *Glœoprium*, and *Schistochilum*.

Mr. James M'Nab read a portion of his Journal of a Tour in the United States and Canadas. In the last notice Mr. M'Nab gave an account of the excursion from Albany to Troy, and thence to Stillwater, with notices of the most interesting plants observed during the journey thither; the present portion is chiefly confined to obser-

vations on the botany of the same district.—July 15. In the early part of the day a severe thunder-storm, accompanied with much rain, prevented the party from going abroad, but afforded an opportunity for arranging the specimens already collected. The storm having abated towards the afternoon, they were enabled to make a short excursion along the banks of the Hudson; few species, however, rewarded their exertions, the greater portion being out of flower; of those gathered, the most attractive were *Lobelia cardinalis* and *Habenaria fimbriata*, both in great abundance, the rich spikes of scarlet flowers of the former being admirably contrasted with the delicate purple blossoms of the latter; these two species formed the bulk of the flowering plants: mixed with them, but more sparingly, *Habenaria lacera* and *Neottia cernua* occurred, with *Apocymum androsæmifolium*, the latter being the most abundant, and covered with a beautiful coleopterous insect, which appeared to be peculiar to it. On the sloping banks of the river, in thickets of shumacs, hazels, willows, &c., a gigantic species of Solomon's seal, *Polygonatum latifolium*, was observed; some of the specimens measured seven feet nine inches in height, with roots four inches in circumference. In several places the ground was so matted over with the stems of the poison oak, *Rhus toxicodendron*, that the hands of the party were much blistered in endeavouring to extricate themselves.—July 16. Having procured a canoe, the party proceeded about two miles down the river: during this short voyage they observed vast quantities of the shells of the freshwater mussel, covering the little sandy hills by the river's edge which had been collected by the musk rats, with which the banks everywhere abound. At this place the rapidity of the stream, which had hitherto prevented the growth of aquatic plants, became much diminished, and they now observed large portions of its surface covered with *Nuphar Kalmiana* and *advena*, together with *Nymphæa rosea*, all beautifully in flower, and growing from a depth of eight feet. Overhanging the banks on both sides of the river, *Salix petiolaris* was in fine condition, its broad lunate stipules adding much to the beauty and singularity of its appearance; here also some fine specimens of the Virginian poplar, *Populus monilifera*, were seen; the largest stems measured were nine foot in circumference and about seventy foot in height.

Leaving Stillwater the party proceeded by canal to Whitehall; on the banks of the canal, and extending over the neglected fields, such quantities of the great mullein, *Verbascum Thapsus*, were observed, as to give the idea of its having been sown for a crop; the fact of its growing on the soil which had recently been thrown out of the canal as well as on the sloping banks, convinced them that the seed must have lain buried in the earth, probably for a long series of years, and that therefore it is not likely, as has been generally supposed, that this plant has been introduced by the emigrants, but rather that it is indigenous to the country. The common St. John's wort, *Hypericum perforatum*, was also extremely abundant in this district, although sparingly seen before, and is described by Mr. M'Nab as one of the greatest evils the American farmer has to contend with,

being supposed to be highly injurious to cattle, especially horses, causing blindness, which prevailed in many parts to a fearful extent.

On reaching Whitehall, situated at the southern extremity of Lake Champlain, two remarkable species of ferns were observed for the first time; namely *Asplenium rhizophyllum* and *Aspidium bulbiferum*, the former growing on the surfaces of moist rocks, where it throws out its fronds which take root at their extremities; while the latter bears a number of small bulbs along the rachis, which, when mature, fall off and vegetate in the crevices of the rocks. Many other interesting plants were observed, but few of them in flower, with the exception of *Rubus spectabilis, Desmodium acuminatum* and *canadense*, and a few others.

Mr. M'Nab afterwards exhibited several specimens of gooseberries and currants which had been kept for the last two years in glasses containing water only, in which they had now matured their fruit for the second time; and it was remarkable that the gooseberries (*yellow amber*) and the red and white currants were as highly flavoured as the same sorts under ordinary treatment.

Mr. Trevelyan exhibited specimens of some remarkable varieties of *Taraxacum officinale* found on the sandy beach near Arbroath, and a curious variety of *Aspidium, felix fœmina*, from Braemar, having the frond branched at the extremity; the specimens were afterwards presented to the Society.

MISCELLANEOUS.

Correction by Dr. Dickie *on* Art. XXI. p. 168 *of this Number.*

CUTLERIA MULTIFIDA.

In justice to so accurate an observer as Dr. Greville, I beg to acknowledge that since my note and figures on the fructification of this genus were made out, I have ascertained that they have reference to its condition when immature.—G. D.

COLOURING OF THE WATERS OF THE RED SEA.

A memoir on the colour of the waters of the Red Sea, by M. Montagne, was read at the Académie des Sciences, July 15th. The conclusions which the author draws from all the facts contained in his memoir, whether already known or entirely new and still unpublished, are the following:—

1. That the name of Erythrean Sea, given first to the sea of Oman and to the Arabian Gulf by Herodotus, afterwards by the later Greek authors to all the seas which bathe the coasts of Arabia, probably owes its origin to the very remarkable phænomenon of the colouring of its waters.

2. That this phænomenon, observed for the first time in 1823 by M. Ehrenberg in the bay of Tor only, then again seen twenty years later by M. Dupont, but in truly gigantic dimensions, is owing to the presence of a microscopic Alga *sui generis*, floating at the surface

of the sea, and even less remarkable for its beautiful red colour than for its prodigious fecundity.

3. That the reddening of the waters of the lake of Morat by an *Oscillatoria* which DeCandolle has described, has the nearest relation to that of the Arabian Gulf, although the two plants are generically very distinct.

4. That as we may well suppose, according to the accounts of navigators, who mention striking instances of the red colouring of the sea, these curious phænomena, though not observed till quite recently, have nevertheless without doubt always existed.

5. That this unusual colouring of seas is not exclusively caused, as Péron and some others seem to think, perhaps as being chiefly zoologists, by the presence of mollusca and microscopic animalcules, but that it is often also due to the reproduction, perhaps periodical and always very prolific, of some inferior Algæ, and in particular of the species of the singular genus *Trichodesmium*.

6. Lastly, that the phænomenon in question, although generally confined between the tropics, is however not limited to the Red Sea, nor indeed to the gulf of Oman; but that, being much more general, it is found in other seas, for example in the Atlantic and Pacific Oceans, as appears in the 'Journal of Researches' by Mr. Darwin, and from the unpublished documents of Dr. Hinds, communicated by Mr. Berkeley, and from which the following extract is given:—

"Dr. Hinds, who sailed in the ship Sulphur, sent to explore the western coasts of North America, first observed on the 11th of February 1836, near the Abrolhos Islands, the same Alga doubtless which Mr. Darwin saw at the same date. This Alga was again seen many days running. Some specimens of it having been brought to Dr. Hinds, he perceived that a penetrating odour escaped from it which had before been thought to come from the ship; this odour much resembled that which exhales from damp hay. In April 1837, the Sulphur being at anchor at Libertad, near St. Salvador, in the Pacific, Dr. Hinds again saw the same Alga.

"A land breeze drove it for three days in very thick masses about the ship. The sea exhibited the same aspect as at the Abrolhos Islands, but the smell was still more penetrating and disagreeable; it caused in a great many persons an irritation of the conjunctive, followed by an abundant secretion of tears. Dr. Hinds himself experienced it. The Alga in question constitutes a distinct species of the genus *Trichodesmium*, and is named by M. Montagne *T. Hindsii*. It differs from that of the Red Sea both in dimensions and smell."—*Comptes Rendus*, July 15, 1844.

M. DE QUATREFAGES ON GASTEROPOD MOLLUSCA.

M. de Quatrefages, at present engaged in the pursuits of natural history on the coasts of Sicily in company with M. Milne Edwards, has sent to the Academy of Sciences a notice on the group of Gasteropod Mollusca for which he has proposed the name of *Phlebenterata*, and of which the following is an abstract.

1. In all the Phlebenterate Gasteropod Mollusca, the function of

digestion is confounded, so to speak, with those of respiration and circulation. It is this that constitutes the dominant character of the group.

2. This kind of fusion occasions the disappearance of the organs of respiration properly so called. No Phlebenterate has branchiæ in the ordinary sense of the word.

3. Through the same cause the apparatus of circulation is progressively simplified until its complete annihilation. No Phlebenterate possesses veins; the arteries and the heart itself disappear in the greater number. When they exist, they are nothing more than organs fitted to agitate and mix the blood. They have no other functions than the dorsal vessel of insects.

4. In the Enterobranchiata the division of the digestive apparatus brings with it the subdivision of the liver. In the Dermobranchiata this gland only forms a portion of the partitions of the gastro-vascular abdominal pouches. In no Phlebenterate does the liver exist as a distinct organ. In the grouping of the Mollusca this anatomical character belongs as yet exclusively to the group of which we are speaking.

5. The reproductive apparatus is always asymmetric in the Phlebenterata. Nearly with this exception, the organs both internal and external exhibit a binary lateral symmetry which would be complete, did not the anus sometimes swerve to the right of the medial line. Such of these mollusks as possess multiple exterior organs tend, moreover, to repeat them in a longitudinal series. By these two tendencies the Phlebenterata approach the type of the annulated animals.—*Comptes Rendus*, July 15th, 1844.

Of the Sexes in Holothuria, Asterias, *and* Planaria:—*Nervous System of* Planariæ.

In a second note, M. de Quatrefages states that by the aid of the microscope he has determined with the most positive certainty, that in *Holothuria tubulosa* and *Asterias rubra* the sexes are separate. In each, the testicles are quite like ovaries in form and position; the nature of the products alone can enable them to be distinguished. He has made similar observations on the *Actinia viridis*. With regard to this latter species, he points out that he could not confound the spermatozoids with the urtical organs that clothe the ovary, and which, taken for the fecundating element by some naturalists, caused them to regard the *Actiniæ* as hermaphrodite; for in the *Actinia viridis* the urtical organs have no resemblance whatever to spermatozoids, and are from ten to twelve times of greater diameter.

In the *Planariæ*, on the other hand, the sexes are really and perfectly united, as Baer and Dugès have admitted; but neither of them had seen the spermatozoids of these animals. M. de Quatrefages states that he has found them in several individuals which likewise bore eggs. The two before-mentioned naturalists had not found any nervous system in the *Planariæ*, and Dugès seems even much disposed to regard them as possessing none. M. de Quatrefages has detected the existence of this system in several species; it was

apparent with the same characters in all: it consists in a double ganglion placed before the buccal orifice from which several threads go off.—*Comptes Rendus*, July 15th, 1844.

On the Chrysanthemum leucanthemum, *considered as a specific remedy against Fleas.* By Prof. CANTRAINE.

During my residence in the eastern countries of Europe, I was astonished at the small number of fleas which are to be found, in spite of the extraordinary dirtiness of the dwellings. I afterwards learnt at Ragusa, that the Bosnians and Dalmatians had found a remedy against these troublesome blood-suckers in the *Chrysanthemum leucanthemum*. They place the plant in the bed of the domestic animals, such as dogs, cats, &c., and the fleas are destroyed in a very short time. If this plant possesses the same virtue in our climate, it might become very useful, not only in the houses of the poor, but even in the mansions of the rich. In order to put this property to the test, it may be well to direct general attention to this very common and well-known plant, the vulgar name of which is the great *Ganzebloeme* (Goose-flower), known in France as *Fleur de St. Jean* (doubtless from its flowering near St. John's day), [and in England as the Common Ox-eye].—*Bulletin de l'Acad. Royale de Bruxelles*, tom. viii. part 2. p. 234.

ON THE BIRDS OF LINCOLNSHIRE AND THE FENS.

From *Drayton's Poly-olbion*, S. xxiii., xxv. *

From Ely all along upon the eastern sea,
Then Lincolnshire herself in state at length doth lay:
Which, for her fatt'ning fens, her fish, and fowl, may have
Pre-eminence: as she that seemeth to outbrave
All other southern shires. . . . . .
She, by the Muses' aid, shall happily reveal
Her sundry sorts of fowl, from whose abundance she
Above all other tracts may boast herself to be
The mistress; and, indeed, to sit without compare:
" My various fleets for fowl, O who is he can tell,
The species that in me for multitudes excel!
The Duck [1] and Mallard [1] first, the falconer's only sport,
(Of river-flights the chief, so that all other sort
They only green-fowl term,) in every mere abound,
That you would think they sat upon the very ground,

* We are indebted to Mr. Yarrell for the notes which are subjoined.—ED.

[1] *Anas Boschas*, female and male. The Peregrine Falcon was the species most commonly used for duck-hawking, and our wild-duck, from its courage as well as its powers of flight, is almost the only duck that will take the air boldly and 'try conclusions' with him. I have been told by falconers, that if it blows hard, the wild-duck can make its way up wind so fast as to get clear off. The Peregrine Falcon is frequently called the Duck-hawk. They breed on high rocks near the coast, and subsist almost exclusively on water-fowl.

Their numbers being so great; the waters covering quite,
That rais'd, the spacious air is darken'd with their flight;
Yet still the dangerous dykes from shot do them secure,
Where they from flash to flash, like the full epicure,
Waft, as they lov'd to change their diet every meal;
And near to them you see the lesser dibbling Teal[2]
In bunches[3], with the first that fly from mere to mere,
As they above the rest were lords of earth and air.
The Gossander[4] with them, my goodly fens do show,
His head as ebon black, the rest as white as snow,
With whom the Widgeon[5] goes, the Golden-eye[6], the Smeath[7];
And in odd scatter'd pits, the flags and reeds beneath,
The Coot[8], bald, else clean black, that whiteness it doth bear
Upon the forehead starr'd, the Water-hen[9] doth wear
Upon her little tail, in one small feather set.
The Water-Woosell[10] next, all over black as jet,
With various colours, black, green, blue, red, russet, white,
Do yield the gazing eye as variable delight
As do those sundry fowls, whose several plumes they be.
The diving Dobchick[11] here amongst the rest you see,
Now up, now down again, that hard it is to prove,
Whether under water most it liveth, or above;
With which last little fowl (that water may not lack,
More than the dobchick doth, and more doth love the brack[12],)
The Puffin[13] we compare, which coming to the dish,
Nice palates hardly judge if it be flesh or fish[14].
"But wherefore should I stand upon such toys as these,
That have so goodly fowls, the wand'ring eye to please?
Here in my vaster pools, as white as snow or mi k,
(In water black as Styx,) swims the Wild Swan[15], the Ilke[15],
Of Hollanders so term'd, no niggard of his breath,
(As poets say of swans, who only sing in death,)
But oft as other birds is heard his tunes to roat,
Which like a trumpet comes, from his long arched throat[16],

[2] *Anas Crecca.*

[3] The word used in falconry and by fen-men for a company of teal.

[4] Gossander, for Goosander, *Mergus Merganser.*

[5] *Anas Penelope.* [6] *Anas clangula.*

[7] Smeath I suppose to have been another name for the Smew, *Mergus albellus.*

[8] Coot-bald or Bald-coot, *Fulica atra.*

[9] Water-hen or Moor-hen, *Gallinula chloropus.* The specific name refers to the green colour of the legs: the under tail-coverts are nearly white, as noticed by Drayton.

[10] Water-Woosell (Water-Ouzel), the Dipper, *Cinclus aquaticus.*

[11] Dabchick or Little Grebe, *Podiceps minor.*

[12] Salt water. [13] *Fratercula arctica.*

[14] Several species of water-fowl, supposed to feed exclusively on fish, are permitted to be eaten by Catholics on their maigre days.

[15] Elk and Hooper, names of the wild swan, *Cygnus ferus.*

[16] See Dr. Latham and Mr. Yarrell's papers in the 'Transactions of the Linnæan Society,' vols. iv. xvi. and xvii., on the convoluted wind-pipes of wild-swans.

And tow'rds this watery kind, about the flashes brim,
Some cloven-footed are, by nature not to swim.
There stalks the stately Crane[17], as tho' he march'd in war,
By him that hath the Hern[18], which (by the fishy car)
Can fetch with their long necks, out of the rush and reed,
Snigs[19], fry, and yellow frogs, whereon they often feed:
And under them again (that water never take,
But by some ditches side, or little shallow lake,
Lie dabbling night and day) the palate-pleasing Snite[20],
The Bidcock[21], and like them the Redshank[22], that delight
Together still to be in some small reedy bed,
In which these little fowls in summer's time were bred.
The buzzing Bitter[23] sits, which through his hollow bill
A sudden bellowing sends, which many times doth fill
The neighbouring marsh with noise, as though a bull did roar.
But scarcely have I yet recited half my store;
And with my wondrous flocks of Wild-Geese[24] come I then,
Which look as though alone they peopled all the fen,
Which here in winter time, when all is overflow'd,
And want of solid sward enforceth them abroad,
Th' abundance then is seen that my full fens do yield,
That almost through the isle do pester every field,
The Barnacles[25] with them, which wheresoe'er they breed,
On trees, or rotten ships, yet to my fens for feed
Continually they come, and chief abode do make,
And very hardly forc'd my plenty to forsake;
Who almost all this kind do challenge as mine own,
Whose like, I dare aver, is elsewhere hardly known.
For sure, unless in me, no one yet ever saw
The multitudes of fowl in mooting time they draw;
From which to many a one much profit doth accrue.
"Now such as flying feed, next these I must pursue:
The Sea-Meaw[26], Sea-Pye[27], Gull[28], and Curlew[29], here do keep,
As searching every shoal, and watching every deep,

[17] *Grus cinerea.* [18] *Ardea cinerea.* [19] Small eels.

[20] Snite or Snipe, *Scolopax gallinago.*

[21] Bidcock and Bilcock, old names for the Water-rail, *Rallus aquaticus.*

[22] *Totanus calidris.*

[23] Bitter or Bittern, *Botaurus stellaris.* The generic name is derived from *Bos* and *Taurus*, in reference to the bull-like roar.

[24] The particular species is doubtful.

[25] In reference to the old fable.

[26] Sea-mew, Sea-mell and Sea-mall, old names for a small common gull. Thus Caliban, among his other offers of service to Stephano, says—

"and sometimes I 'll get thee
Young sea-mells from the rocks."

Shakespeare's 'Tempest,' Act. 2, Scene 2.

[27] Sea pye, a name for the Oyster-catcher, *Hæmatopus ostralegus*, in reference to its black and white colours.

[28] Already noticed.

[29] *Numenius arquata.* Both words refer to the bent form of the beak; *numenius* meaning 'new moon.'

To find their floating fry, with their sharp piercing sight,
Which suddenly they take by stooping from their height.
The Cormorant[30] then comes (by his devouring kind),
Which flying o'er the fen, immediately doth find
The Fleet best stor'd of fish, when from his wings at full,
As though he shot himself into the thicken'd skull[31],
He under water goes, and so the shoal pursues,
Which into creeks do fly, when quickly he doth choose
The fin that likes him best, and rising, flying feeds.
The Ospray[32] oft here seen, though seldom here it breeds,
Which over them the fish no sooner do espy,
But (betwixt him and them by an antipathy)
Turning their bellies up, as though their death they saw,
They at his pleasure lie, to stuff his glutt'nous maw."

[30] *Phalacrocorax carbo.*
[31] Skull, or scool, a shoal; so, in Cornwall, a scool of pilchards, &c.
[32] *Pandion haliaëtus.*

METEOROLOGICAL OBSERVATIONS FOR JULY 1844.

Chiswick.—July 1. Slight haze: cloudy: thunder, with rain from 6 till 8 P.M. 2. Rain: cloudy. 3. Cloudy. 4. Slight rain: cloudy. 5, 6. Fine. 7. Hazy and mild: overcast. 8. Hazy: very fine. 9—11. Very fine. 12. Very fine: showery. 13. Rain: heavy rain at night. 14, 15. Clear and fine. 16. Overcast. 17. Fine: dusky clouds: hazy. 18. Very fine: cloudy. 19. Overcast: thunder quarter to 1 P.M.: thunder-showers in afternoon. 20, 21. Clear and fine. 22. Cloudless and very hot. 23, 24. Sultry. 25. Very hot. 26. Cloudy: clear. 27. Hot and dry. 28. Very fine: cloudy. 29. Hot and very dry: exceedingly clear at night. 30. Overcast: rain. 31. Cloudy and fine: clear.—Mean temperature of the month 1° above the average.

Boston.—July 1. Fine: rain A.M. 2. Cloudy. 3. Fine. 4. Fine: rain P.M. 5. Rain. 6—8. Cloudy. 9—11. Fine. 12. Fine: rain A.M. 13. Fine: rain A.M. and P.M. 14. Stormy. 15. Fine: rain A.M., with thunder. 16. Fine: rain P.M. 17. Fine. 18. Fine: rain P.M., with thunder and lightning. 19. Fine: rain P.M. 20, 21. Fine. 22. Fine: thermometer 81° 2 o'clock P.M. 23. Fine: thermometer 80° 3 o'clock P.M., in the sun 112°. 24. Cloudy: rain A.M. 25. Fine: rain P.M. 26, 27. Cloudy. 28. Fine. 29. Fine: rain early A.M.: rain P.M. 30. Cloudy: rain P.M. 31. Cloudy: rain, with thunder and lightning A.M.

Sandwick Manse, Orkney.—July 1. Cloudy. 2—6. Drizzle: showers. 7—9. Cloudy. 10. Cloudy: showers. 11. Showers: cloudy. 12. Damp: cloudy. 13. Bright: cloudy. 14. Cloudy. 15. Cloudy: clear. 16. Bright: clear. 17. Clear. 18. Clear: showers. 19. Cloudy: showers: drizzle. 20. Cloudy. 21. Cloudy: showers. 22. Cloudy: fine. 23. Clear: fine. 24. Bright: cloudy. 25. Clear: fine. 26. Clear: fog. 27. Clear: fine. 28. Bright: showers: fog. 29. Drizzle. 30. Cloudy. 31. Rain.

Applegarth Manse, Dumfries-shire.—July 1. Fine: a few drops of rain. 2—4. Fine: sultry. 5. Fine, but cloudy. 6. Slight shower. 7. Fine and fair. 8. Fine: a few drops of rain. 9. Fine, but cloudy. 10. Showers. 11. One shower. 12. A few drops of rain. 13. Heavy rain. 14. Showers: thunder. 15—17. Showers. 18. Showers: thunder. 19. Slight shower: thunder. 20. Fair. 21. Wet all day. 22. Fine. 23. One heavy shower: thunder. 24—26. Rain: heavy P.M. 27. Beautiful day. 28. Showers. 29. Fair. 30, 31. Rain.

Meteorological Observations made by Mr. Thompson *at the Garden of the Horticultural Society at* Chiswick, *near London; by* Mr. Veall, *at* Boston; *by the* Rev. W. Dunbar, *at Applegarth Manse,* Dumfries-shire; *and by the* Rev. C. Clouston, *at Sandwick Manse,* Orkney.

Days of Month.	Barometer.							Thermometer.							Wind.				Rain.			
	Chiswick.		Boston. 8¾ a.m.	Dumfries-shire.		Orkney, Sandwick.		Chiswick.		Boston. 8¾ a.m.	Dumfries-shire.		Orkney, Sandwick.		Chiswick. 1 p.m.	Boston.	Dumfries-shire.	Orkney, Sandwick.	Chiswick.	Boston.	Dumfries-shire.	Orkney, Sandwick.
1844. July.	Max.	Min.		9 a.m.	9 p.m.	9½ a.m.	8½ p.m.	Max.	Min.		Max.	Min.	9½ a.m.	8½ p.m.								
1.	29·853	29·829	29·39	29·77	29·77	29·90	29·90	79	54	57	67	47	49½	49	s.	calm	se.	n.	·34	.....	.....	.....
2.	29·841	29·832	29·37	29·80	29·80	29·91	29·91	69	53	60	63½	49	52	47	n.	calm	sse.	n.	·22	·07	.....	·13
3.	29·876	29·809	29·43	29·79	29·73	29·90	29·90	72	57	62	67	50	48½	47½	se.	calm	s.	nne.	·14	.....	.....	.....
4.	29·638	29·596	29·19	29·69	29·67	29·84	29·78	68	55	63	60	49	52	48	sw.	calm	ne.	nw.	·01	.....	.....	.....
5.	29·656	29·576	29·13	29·65	29·63	29·73	29·70	70	50	55	64	49½	49	47	ne.	calm	se.	n.	·06	·79	.....	.....
6.	29·878	29·809	29·34	29·71	29·80	29·80	29·92	65	54	60	64	53	48	46	n.	calm	s.	nw.	·06	.....	.....	·06
☾ 7.	29·995	29·929	29·50	29·88	29·85	29·95	29·95	68	53	57	67	52	48½	46½	e.	calm	s.	nw.	·13	.....	0·06	.....
8.	29·931	29·856	29·47	29·84	29·78	29·88	29·84	77	58	55	66	46	55	49	w.	sw.	w.	se.	.....	.....	.....	.....
9.	29·906	29·850	29·34	29·76	29·81	29·87	29·87	74	49	64	62½	49	53	51½	n.	w.	w.	w.	.....	.....	.....	.....
10.	29·967	29·880	29·44	29·81	29·66	29·76	29·62	78	60	65	63	47	59½	52	sw.	calm	w.	ssw.	.....	.....	.....	.....
11.	29·880	29·864	29·29	29·67	29·65	29·44	29·54	78	56	64·5	63½	51	52	50½	w.	w.	sw.	w.	.....	.....	.....	·25
12.	29·939	29·870	29·27	29·72	29·78	29·64	29·74	78	56	63	62	50	51½	48½	w.	w.	wnw.	wnw.	·06	.....	.....	·05
13.	29·905	29·494	29·33	29·65	29·17	29·64	29·48	71	56	62	58½	48	56	51	sw.	calm	sse.	se.	·53	·08	.....	.....
14.	29·679	29·530	28·88	29·20	29·59	29·44	29·64	75	47	62	62	51	53	49	w.	w.	s.	n.	.....	·36	.....	.....
● 15.	29·928	29·809	29·30	29·60	29·70	29·71	29·82	76	46	65·5	61	42	52	50	w.	w.	sw.	nw.	.....	.....	1·10	.....
16.	29·994	29·949	29·47	29·82	29·89	29·87	29·93	75	42	62	63	41½	51	49	sw.	calm	w.sw.	.....	.....	·16	.....	.....
17.	30·023	29·848	29·50	29·87	29·76	29·92	29·84	73	52	62	64	42	57	46	n.	calm	sw.	se.	.....	·34	.....	·09
18.	29·752	29·718	29·23	29·65	29·60	29·73	29·72	73	45	63	59	48½	54	47½	w.	calm	w.	n.	.....	.....	.....	.....
19.	29·891	29·723	29·24	29·68	29·80	29·76	29·92	74	44	59	63	46½	52	50	n.	calm	sw.nw	n.	·39	·29	.....	.....
20.	30·174	30·067	29·58	29·99	30·09	30·08	30·17	76	43	62	65	42	52½	50	nw.	calm	sw&s.	n.	.....	·15	.....	·03
21.	30·275	30·227	29·76	30·06	30·07	30·08	30·01	82	49	63	59½	48½	52½	54	s.	calm	se.sw.	e.	.....	.....	.....	.....
☽ 22.	30·190	30·044	29·59	30·03	29·97	29·96	30·00	89	53	72	68½	56	67	60	sw.	calm	s.	ssw.	.....	.....	0·76	·06
23.	29·999	29·910	29·40	29·90	29·83	29·98	29·98	89	61	75	76	50	68	58½	e.	calm	ese.	ese.	.....	.....	.....	.....
24.	29·948	29·916	29·33	29·86	29·90	29·98	30·00	87	53	67	76	49½	62½	55	e.	s.	sw.	sse.	.....	.....	.....	.....
25.	29·956	29·901	29·35	29·87	29·84	30·00	29·98	92	62	70·5	75	59½	61½	56½	s.	calm	se.	ese.	.....	·05	.....	.....
26.	30·110	29·908	29·30	29·91	30·03	30·02	30·13	74	55	67	66	58	60	55	nw.	calm	ne.	nw.	.....	·05	.....	.....
27.	30·181	30·161	29·55	30·10	30·11	30·15	30·14	83	50	65	71½	51	57	55½	nw.	w.	sse.	nw.	.....	.....	.....	.....
28.	30·197	30·005	29·59	30·05	29·89	30·04	29·92	88	57	70	68½	57½	64	55	sw.	calm	ssw.	sse.	.....	.....	.....	.....
○ 29.	29·965	29·947	29·38	29·88	29·75	29·88	29·87	76	44	62	67	50½	53	52½	nw.	n.	ssw.	nw.	.....	·10	.....	·37
30.	29·828	29·474	29·24	29·56	29·20	29·64	29·57	68	55	60	59½	48	56	52½	sw.	calm	ssw.	se.	·14	·03	2·05	.....
31.	29·708	29·529	28·94	29·45	29·47	29·58	29·56	72	49	60	59	53	52½	53	w.	nw.	sse.	nw.	·02	·16	.....	·13
Mean.	29·937	29·833	29·35	29·780	29·760	29·841	29·850	76·38	52·19	63·0	64·8	47·9	54·83	51·04					2·10	2·63	3·97	1·17

THE ANNALS

AND

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XXVII.—*Upon the Development of Star-fishes**. By M. Sars†.

[With a Plate.]

An unexpected delay having attended the publication of the above work, in which my observations upon the present subject will appear in full, I propose in the mean time to give the substantial results of my investigations upon the development of *Echinaster sanguinolentus*‡ (*Asterias sanguinolenta*, O. F. Müller §), and *Asteracanthion Mülleri*, a new species closely allied to *A. glacialis*‖.

1st. The *Asteriadæ* possess male and female organs of generation separate upon distinct individuals. The period of propagation commences in the spring, and is effected by means of ova, which make their appearance in the vesicles of Purkinje and the spot or cell of Wagner contained within these. (Pl. III. figs. 3—6.) These ova are developed gradually within the ovaria, and are given birth to by several broods at distinct intervals of time, becoming probably (for this point has not yet been positively ascertained) detached from the ovaria, and after falling into the cavity of the body, reach the ventral surface of the animal by means of special apertures.

[*Observation.*—The ova being thus gradually extruded, explains why they are found within the ovary of such very different stages of development (Pl. III. figs. 4, 5), that young as well as ova are met with in the uterine cavity of the mother.]

* Being a fragment from a work entitled 'Beiträgen zur Fauna von Norwegen.'

† From Wiegmann's Archiv, Part 2, 1844. Communicated by A. Tulk, M.R.C.S.

‡ Joh. Müller observes, that this species is undoubtedly the same as the *E. Sarsii* of Müller and Troschel. *A. sanguinolenta* proves to be the *E. sepositus* of the same authors. Three *Asteriadæ* of this colour occur in the Northern Seas.

§ *Cribella oculata* of British authors: see Forbes's British Star-fishes, p. 100.

‖ I am not at present authorized in extending such statements to other Star-fishes, as it appears indeed that generation is one of those functions of animal life which is subject to most variation even among the lesser groups of allied beings.

2nd. The ova when laid (fig. 7) consist of a chorion investing a small quantity of albumen, and the vitellus, which last soon exhibits the usual process of transverse division (figs. 8—10) now ascertained to occur in most classes of animals; they do not escape forthwith into the sea, but are received into a kind of external uterus formed by the parent voluntarily bending the ventral surface of the disc and its arms, and which may be compared in some respects with the pouch of the Marsupial Vertebrata. Here the ova are hatched, and the young gliding from their interior remain a considerable length of time, undergoing the progress of development. This uterine receptacle is completely closed while the ova are being deposited therein, and until the organs of attachment of the young are perfectly developed. During the whole of this time the mother can probably take no nourishment, since the cavity being shut admits of no communication to the oral aperture from without; in this curved and contracted state (fig. 2) the Star-fishes have been observed to rest immoveably in the same spot for at least eleven days. A truly remarkable example this of the care bestowed upon their young by animals otherwise upon the lowest grade of organization!

[*Obs.*—We are acquainted among the lower animals with several examples of a kind of incubation being required by the ova in order that they may attain their development. Thus in the *Medusæ* the ova pass out from the ovaria into the pockets formed by the four large oral cæca; in the freshwater Mollusks, as *Unio*, *Anodonta*, into the external branchial lamellæ; in the Crustacea to beneath the belly or tail, in order to be submitted for a certain time in these situations* to the maternal influences. There is however, as far as I am aware, no other example of a uterine cavity being formed voluntarily by the mother on the outside of her own body, and in this respect the instinct of the Star-fishes is indeed unique. The circumstance of the Star-fishes taking no nourishment during the incubation of their ova, finds its analogue in the similar behaviour of several other animals, *e. g.* in the Serpents, according to the observations of Valenciennes, who records an instance of a Python that fasted fifty-six days while engaged in cherishing its eggs.]

3rd. The whole of the vitellus becomes converted into the fœtus. The latter, upon escaping from the ovum, has an oval cylindrical form (fig. 11), is destitute of external organs, and swims about freely in the water by means of numerous cilia covering the body, like the Infusoria or newly-hatched young of *Medusæ*, *Coryneæ*, *Alcyoniæ*, &c., which it very much resembles

* According to Joly (Mém. sur la Caridina Desmarestii in Ann. des Sci. Nat. 1843, p. 61), the eggs of the Crustacea cannot be withdrawn from the mother without perishing.

in form. This then is the first or Infusorial stage of structure in the Star-fish. After a few days, organs (fig. 12, *a a*) begin to grow from that extremity of the body which during swimming was directed forwards. These, which are to serve the purposes of attachment, appear in the shape of papillæ; first of all one on one side (fig. 12), then two smaller ones upon the other (fig. 13, 13 b, *a a*): subsequently the first divides itself into two, so that we now meet with four such papillæ of nearly equal size and club-shaped (figs. 14—16, *a a*), and in the middle between them a smaller one (figs. 14—16, *b*). By aid of these organs the young fixes itself firmly to the walls of the uterine cavity. The body now becomes flattened, depressed (figs. 14—17) and circular, and upon one of the broad surfaces, which is thus proved to be the ventral, the tentacula begin to sprout forth as small round papillæ, radiating in ten rows from a common centre; two of which are approximated together, there being only two papillæ in each row (fig. 14, *c c*). Upon being detached from the spot to which it had fixed itself, the young still swims in the water through the agency of its vibratile cilia, and always with the organs of attachment directed forwards; but when undisturbed it adheres firmly and immoveably to the place of attachment, never once quitting it. In this condition, or the second stage of development, which has been called the Crinoidal,—for we know of no other class of Star-fishes, except that of the *Crinoidea*, which are sessile, at least when young, to compare it with,—the young *Asterias* is still bilateral in symmetry, and the organs of attachment are seen to be constantly directed forwards, and by means of the organs (figs. 14, 15, *a a*) already mentioned as being unequally developed upon the two sides of the body, an anterior and posterior, as well as a right and left side, may be defined. The dorsal and ventral surfaces are already indicated by the tentacula. By degrees, however, this bilateral form passes into the radiary, the third and perfect stage of development in the Star-fish, in which the body becomes pentangular by its border growing out into five very short and obtuse arms (figs. 18, 19). The tentacula lengthen out into cylindrical tubes (fig. 20, *c c*) with sucking-cups at their extremity, to assist them in the act of creeping. At the apex of the arms we remark the organ regarded by Ehrenberg as the eye (fig. 18, *b*); the mouth presents itself to view upon the ventral surface, and numerous spines (figs. 19, 20) grow upon the integument of the body and arms. By and by the organs of attachment begin to diminish gradually in bulk (fig. 20, *a a*) and finally to disappear, the swimming movements to cease with the obliteration of the cilia, and the young Star-fish, now become completely radiated in form (fig. 20, *a a*), creeps freely about by means of its still disproportionately long tentacles (fig. 21, *c c*). The whole of this de-

velopment is completed within an interval of from six to seven weeks. The perfectly developed young still however abide a long time, at least in one of the examined species (*Asteracanthion Müllerî*), within the uterine cavity of the parent, and are so carried about by the latter. In the other species, the *Echinaster sanguinolentus*, I have met with young of a radiary form, and with the organs of attachment not yet obliterated within the uterus; but whether they remain there longer than those of the former species, or how long, I have not yet been able to ascertain.

4th. The question presents itself, are the Star-fishes subjected in the progress of development to a metamorphosis or not? The answer to this will depend on the more or less extended sense in which we please to adopt the term. If we understand by it, with some naturalists, that abrupt transition from one condition of structure to another, in which, as in the passage of the insect from the larva to the pupa state, and this again to the imago, there is a complete change of external form, then indeed the *Asteriadæ* cannot be said to undergo any such transformation; but if, on the other hand, we take the word in the usually received sense, thus expressed by Lamarck*, "Je nomme metamorphose cette particularité singulière de l'insecte de ne pas naître soit sous la forme, soit avec toutes les sortes des parties qu'il doit avoir dans son dernier état," then we must concede it as fully applicable to the creatures under consideration. For their form, we have already learnt, is in those two stages of development that I have considered to be the earliest, bilateral instead of radiated, and the young enter the world without possessing most of the more important parts belonging to their organization, such as mouth, arms and tentacles, these being produced at a subsequent, later period. Furthermore, parts are developed, for instance, the above-mentioned organs of attachment, which are destined only for immature age, and therefore disappear entirely as the animal approaches to maturity. In this last respect their metamorphosis has been termed retrograde, and offers an example of what Rathke calls "metamorphosis retrograda per dissolutionem†." The reason for the disappearance of the organs of attachment depends upon their becoming utterly useless, on account of the development of tentacles with which the young Star-fish begins a new method of locomotion, and enters into other relations with the external world.

* Hist. Nat. des Animaux sans Vertèbres, p. 277, tom. iii.

† Rathke must have misunderstood me when quoting my observations from Wiegmann's 'Archiv,' 1837, in his 'Travelling Notes from Scandinavia': he alleges "that the Star-fishes possess when very young a delicate stem, which proceeds from the middle of their back, and by which they attach themselves to other bodies."

[*Obs.*—We have also seen, so far as we could prosecute the inquiry, that traces of the disappearance of the organs of attachment are still left distinctly visible as two very small papilliform projections, situated close together, and which appear to recede more and more towards the dorsal surface. I am now, although unable to demonstrate directly the fact, convinced, that what is called the madreporoid plate in the adult Star-fishes is nothing else than the remnant of the organs of attachment dwindled to a single small tubercle. Joh. Müller and Troschel, in alluding to the problematical nature of this madreporoid plate, thus express their opinions concerning it: "At first sight it appears not unnatural to compare this plate in the *Asteriadæ* and *Echini* or Sea-urchins with the knot of the *Comatulæ*; nor can the eccentric position of the madreporoid plate be taken as any objection to the analogy being drawn, for it is placed in the Clypeasters upon the dorsal pole. Meanwhile, however, the constant occurrence of more than a single madreporoid plate in some species of Star-fish militates against the comparison, and its true signification can be probably explained only by the study of its development. According to the observations of Sars, the *Asteriadæ* are freely locomotive when young and not attached to rocks."

If now my view of the madreporoid plate being a relic of the organs of attachment be correct, we may very well compare it with the knot of the *Comatulæ* and the stem of other *Crinoidea*. The authors already quoted, in objecting to this comparison contained in my observations in Wiegmann's 'Archiv' for 1837, appear to me to have contributed rather to substantiate than invalidate the opinion.

This view of mine relative to the nature of the madreporoid plate must tend in an unexpected and remarkable manner to confirm the ingenious theory advanced by Agassiz respecting the bilateral type of the Echinodermata. For in addition, the organs of attachment having been already proved to be placed in an interradial interval, through which the long axis of the Star-fish passes, the determination of the front and back of the animal given by the same author becomes decisive, since that end of the body by which the young Star-fish attaches itself must surely be taken for the posterior. The Star-fish indeed, in its earliest state of adolescence, swims with this end of the body directed forwards, on which account we might regard it as anterior, and this we have done provisionally upon a former occasion; but the analogy alone of other animals, such as the young of the *Medusæ*, as I have described them in their first or marsupial stage*, and of the compound *Ascidiæ* observed by Milne Edwards†, lead us to the recognition of the fact, that the end which during swimming was directed

* Wiegmann's Archiv, 1841.

† Observ. sur les Ascidies composées des côtes de la Manche.

forwards, in becoming fixed at a later period, proves itself to be in reality the posterior.

In regard to those species of Star-fish that are provided with several madreporoid plates, no theory can at present be hazarded with any degree of probability. Perhaps they possess at an early period several separate organs of attachment.

In conclusion, I would insist upon the naturalist being very guarded in his attempts to generalize, for it is probable that when the relations of development between other genera and species of Star-fishes come to be more closely investigated, greater differences will be detected than could have been *à priori* surmised. Thus *Asteracanthion rubens* differs distinctly from *Echinaster sanguinolentus*, whose genital openings must be placed upon the ventral side, inasmuch as, according to Müller and Troschel, these very apertures are found upon the dorsal region in the *Asteracanthion rubens*, on which account its eggs probably fall into the sea and are left to take care of themselves. This is perhaps the reason why, in spite of my industrious researches at the most different times of the year, I have never found the young, or even any indication of incubating instinct in this species. Another species of the same genus, *Asteracanthion Mülleri*, agrees, as we have seen, with *Echinaster sanguinolentus*. The development of some other Star-fishes appears to be still more anomalous. Thus the animal, formerly* called by me *Bipinnaria asterigera*, I conjecture, from more recent investigations (to be published upon some future occasion), to be only a Star-fish provided during its development with a large natatorial apparatus.

I cannot here refrain from observing, that the development of the Star-fishes, so far as we are acquainted with it, exhibits important departures from that of the other Radiated animals, the Polyps and Acalephæ, a greater number at least of which are distinguished by the peculiar form of the incubating organ, or marsupium. The Star-fishes are developed without any such change in the generative process from the state of an ovum to the peculiar type of their group, and in this respect agree with the Articulata and Vertebrata, to which they form the first approximative step, both by their peculiar pointed calcareous skeleton, and in the remarkable instinct with which they nurse their young.]

EXPLANATION OF PLATE III.

Fig. 1. An *Echinaster sanguinolentus*, natural size, seen from the ventral aspect, with the incubating cavity half open, disclosing within the bright red-coloured young.

Fig. 2. The same seen in profile, resting with the cavity completely closed; *a*, the madreporoid plate.

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* Beskrivelser og Jagttagelser, etc. p. 37. tab. 15. fig. 40.

Fig. 3. Ovarium of a smaller individual examined 25th of February.
Fig. 4. The same magnified, showing the very unequally developed ova.
Fig. 5. A canal of the same ovarium still more magnified.
Fig. 6. One of the smaller ova from this canal, showing the Purkinjean and Wagnerian vesicles.
Fig. 7. An ovum laid 7th of March. The chorion is colourless, the vitellus bright red and smooth; between the two is placed the limpid albumen. 7′ nat. size.
Figs. 8—10. Exhibit the bipartition of the vitellus in the same ovum. *Fig.* 8, on the morning of March 9th; *Fig.* 9, evening of the same day; and *Fig.* 10, on evening of March 10th.
Fig. 11. The young escaped from the ovum and found in the uterine cavity March 17th. It is cylindrical, without visible external organs, and covered by cilia. This is the first or Infusorial stage of the Star-fish.
Figs. 12—20. The second or Crinoidal stage of development.
Figs. 12, 13. Young found in the marsupial cavity March 17th, with the organs of attachment sprouting forth, *a a*. *Fig.* 12 is very slightly depressed or still nearly cylindrical, and exhibits the commencement of these organs by two papillæ, *a a*, one of which projects more than the other, but by it the young can as yet not attach itself. In *Fig.* 13 one of these papillæ has divided into two, and all three serve as instruments of attachment. *Fig.* 13 *b*. The same young one from the front. 13′ nat. size.
Figs. 14—17. Young met with April 3rd in the marsupium. They are tolerably flattened, with four completely developed clavate organs of attachment, *a a*, and a lesser papilla in the middle between them. By means of these organs the young fix themselves to the walls of the marsupium. *Fig.* 14, seen from the ventral surface, exhibits the tentacula, *c c*, sprouting forth as very small papillæ in ten rows radiating from the centre of the body, two of which are approximated, there being two papillæ in each row. *Fig.* 15. The same young one seen from the dorsal surface. *Fig.* 16. Ditto from the front. *Fig.* 17. A young specimen seen from the front, with only three clavate organs of attachment.
Figs. 18—20. Represent the transition from the hitherto bilateral condition of the young to the third or radiary condition.
Fig. 18. One of the young depicted. *Figs.* 14—16. Further developed, April 15th, and seen from the ventral side. The body has become pentangular, and surrounded by a border thicker and more incurved in the intervals of the five sprouting arms. The tentacles become larger and more distinct, and at the end of each of the five arms is perceived a small round papilla *b*, regarded by Ehrenberg as an eye.
Fig. 19. The same young represented from the dorsal side. The circular sheath distinguished by a groove from the arms. Upon the skin numerous spines grow. 19′ nat. size.
Fig. 20. The same young seen from the dorsal surface April 23rd. The tentacles *c c* are lengthened into long tubes and serve now to creep with. The organs of attachment *a a* begin to decrease.
Fig. 21. The same on May 4th, dorsal view. *Fig.* 22. Ventral view. The mouth is distinct, the organs of attachment have disappeared, and the young, now become completely radiary, creeps about by means of its tentacles. *Fig.* 22, nat. size.

At the end of the month of May the arms had become longer and narrower, and the number of the tentacles increased to five in each of the ten rows.

XXVIII.—*On the Fructification of* Gloiosiphonia capillaris, *Carm.* By the Rev. David Landsborough*.

[With a Plate.]

In the May Number of the 'Annals of Natural History' there is an interesting article by William Henry Harvey, Esq., at the close of which that distinguished botanist says, "Many interesting additions to our marine flora may be expected from Mr. M'Calla's researches on the west coast of Ireland. In addition to the present new species (*Codium amphibium*), he has already found fine specimens of some very rare Algæ, as *Gloiosiphonia capillaris, Conferva rectangularis* and others." The *Conferva* I don't know, but the *Gloiosiphonia* was found by me last year in the bay at Saltcoats; I observed it at low water in a little channel betwixt two rocks, and as I was retreating with all convenient speed from the returning tide, lest I should be circumvented as I had been some days before. I snatched only a small portion from a large growing bunch of it, thinking that it was some common thing in rather an uncommon aspect. On floating it in fresh water, spreading it on paper, and exposing it to the air, in a very short time it changed from a dull brownish red to a fine crimson colour. On examining it I was led to conclude that it was *Mesogloia*, now *Gloiosiphonia capillaris*, Carmich.; but to be quite sure I sent a specimen of it to Mr. Ralfs of Penzance, who has often skilfully and obligingly resolved my algological doubts, and he soon returned it named *Gloiosiphonia capillaris*.

My son and daughter found it again this season, early in June, in the same place; at ebb tide it was found rather abundantly in shallow water, but what was thus found was of a dirty yellow colour, and on being spread out it changed only to pale pink. David found better specimens by wading to a considerable depth, and catching the plants with his toes. The plants found in deep water had a reddish tinge, and on being floated in fresh water and exposed to the air they soon changed into as bright a red as *Delesseria sanguinea*, and made very beautiful specimens.

One little specimen he found was rich in fruit; and I write this to describe its three kinds of fructification, *all* of which I have not seen described, although it may have been done unknown to me. The specimen found by my son had only one kind of fructification, and that was very like the hemispherical fruit of *Plocamium coccineum*, except that it was surmounted by a process which gave it an urceolate appearance, or it might be likened to the boss of a buckler (Pl. IV. fig. 4. *a*). The hemispherical base was full of purple-coloured matter.

* Read to the Botanical Section of the Glasgow Philosophical Society, June 25th, 1844.

A specimen with different fruit was found by my daughter on the shore at Ardrossan. It had not the hemispherical urceolate capsules, but it had instead purple tufts not unlike the fruit of *Odonthalia dentata*: they had the appearance of a little mass of short truncate ramuli. In general they were sessile, but in one case the mass was raised on a short purple pedicel (Pl. IV. fig. 3. *a*).

The third kind of fructification consists of granules *imbedded* in the branches. In the specimens with tufted fructification these were small, of a purple colour, and situated in the upper ramuli, to which they gave a dotted appearance (Pl. IV. fig. 4. *b*). What I am disposed to think the most common kind of fructification occurred in other specimens, viz. large *buff-coloured* granules generally imbedded in distorted ramuli (Pl. IV. fig. 5). At times they are only partially imbedded, producing protuberances which are filled with countless very minute granules around the large granule. At other times the large buff-coloured granules are quite external but sessile, at a certain stage falling off, not to be lost in the depths of ocean, but in all likelihood to produce a fresh generation of young *Gloiosiphoniæ*.

Of these large buff granules there are seldom more than three in one branch, whilst the small granules imbedded in the ultimate branches are like purple points or dots, very numerous, but quite distinct from each other.

I may also state that the ultimate ramuli generally seemed jointed like *Ceramium rubrum*, and of a pink colour; yet there were occasionally intermingled little branches with fawn-coloured joints and white articulations so very like *Ceramium diaphanum*, that I should have concluded that this *Ceramium* had fastened as a parasite on the *Gloiosiphonia*, had I not seen that the same little branch which set out as a *Gloiosiphonia*, without any warning given suddenly assumed the aspect of *C. diaphanum*.

EXPLANATION OF PLATE IV.

Fig. 1. Capsule of *Polysiphonia parasitica*.
Fig. 2. *Polysiphonia parasitica*, with granules and dwarf capsule.
Fig. 3. *Gloiosiphonia capillaris*: *a*, tuft of fruit.
Fig. 4. Ditto, ditto: *a*, capsule; *b*, small imbedded granules.
Fig. 5. Ditto, ditto, with large granules in distorted ramuli.

XXIX.—*Brief Descriptions of several Terrestrial* Planariæ, *and of some remarkable Marine Species, with an Account of their Habits.*

By Charles Darwin, F.R.S., V.P. Geol. Soc.

[With a Plate.]

In my Journal I have given a brief account of the discovery of several species of terrestrial *Planariæ*: it is my intention here to

describe them. They all belong to the genus *Planaria*, as restricted by A. Dugès in his memoir* on these animals, and to that of *Polycelis* of Ehrenberg. They may, however, form a section of the genus, being characterized by their more convex and narrow bodies; their more distinctly defined foot; their terrestrial habits; and frequently by their longitudinal bands of bright colours. From their colours, from their convex bodies, from their manner of crawling and the track of slime which they leave behind, and from their places of habitation, they present a striking analogy with some terrestrial gasteropods, especially with *Vaginulus*, with which snail I have several times found them associated under stones. I suspect that, differently from their aquatic congeners, they live on vegetable matter, namely on decayed wood; I suspect this, from having found them repeatedly under this substance, and from having kept some specimens in a box for twenty-one days with nothing else for food, where they increased considerably in size. The species which live under stones, both on the grassy, undulating land of northern La Plata, and on the arid, rocky hills of central Chile, generally inhabit small sinuous chambers, like those frequented by earth-worms, in which they lie coiled and knotted up. They are often found in pairs; and I once discovered a pair attached together by their lower surfaces, apparently in copulation. None of these species have the quick and vivacious movements of the marine species: they progress by a regular wave-like movement of the foot, like that of a gasteropod, using the anterior extremity, which is raised from the ground, as a feeler. One species which I tried could crawl well through moss; another being placed on dry paper was almost killed by it. I put several specimens into fresh water, but they appeared wholly unused to it, and would soon have perished: they seem, however, to prefer damp situations, and the specimens of *P. Tasmaniana*, which I kept in a box with rotten wood, having been neglected to be moistened, all perished, except one large individual which survived quite uninjured, although the wood had become perfectly dry. These animals (especially the *P. Tasmaniana*) had an immediate apprehension and dislike of light, which they showed by crawling, when the lid of the box was taken off, to the under side of the pieces of rotten wood. My observations, as far as they go, on the structure of these terrestrial species, agree with those given by Dugès on the structure of the aquatic species. The figure given by this author of the ramified digestive vessels of *P. lactea* is quite similar to a drawing that I made of this part in the *P. pallida* from Valparaiso (which, from being nearly colourless, allowed the best opportunity of observa-

* Annales des Sciences Naturelles, October 1828.

tion), except in the entire absence of ramifications on the internal sides of the two posterior prolongations of the main digestive cavity. There is generally a colourless space round the alimentary and genital orifices. The mouth-sucker is bell-shaped, with a very short œsophagus: when contracted it forms either a globular or star-shaped hard ball: I never saw it voluntarily protruded, but have no doubt that it can be, for immersion into very weak spirits of wine or salt water caused its exsertion, and on being touched it was immediately retracted. This mouth-sucker is highly contractile, and retains its irritability long after the death and even dissolution of the rest of the body: the external orifice, through which it is protruded, consists of a transverse slit. The genital orifice, also, consists of a transverse slit; in the aquatic species it is generally, if not always, circular. In my notes on several of the species, I find it stated that the under surface or foot is thickly studded with very minute, angular, opake, white specks: may not these serve for the necessarily copious secretion of slime? These animals, when placed on a slip of glass, frequently propelled a globule of air, between their foot and the glass, from their anterior extremity towards their tail; and as the air came in contact with successive parts of the foot, a violent corpuscular movement (curiously resembling microscopical eels disturbed by a stick, and struggling in mud) was produced in the slimy surface. I could never perceive it in any part of the foot, except when in contact with air; but it was evident, though less energetic, on parts of the back, and at the extreme anterior extremity of the body. I presume that the appearance is due to vibratile cilia; and it is worthy of remark, that M. Dugès* suspects that the foot, in the freshwater species, is the chief seat of this respiratory action, from having observed that they frequently arch their bodies, so as to allow fresh water to circulate under it. The position of the black eye-spots varies in the different species: it is remarkable that, in the *P. elongata* from Tres Montes, I could perceive no trace of these ocelli, although this is the largest species. According to Prof. Ehrenberg's arrangement, depending on the presence and number of the ocelli, this species would rank in his genus *Typhoplana*; but from the variability in number and position of these imperfect organs of vision, I should doubt whether they ought to afford generic characters. In the *P. pallida* I examined the ocelli with a strong lens, and found that they were not truly circular; the black part lies within a transparent envelope; in this species they are seated on the upper margin of the body, in groups of two and three, exactly over the extreme lateral subdivisions of the intestinal vessel. I was not able to see ova

* Annales des Sciences Naturelles, October 1828, p. 28.

within any of the terrestrial species. The texture of the body, its prompt dissolution into fluid after death, its power of healing wounds, its irritability and contractile powers, appear to be exactly similar in the terrestrial and in the aquatic species, as described by Dugès. I will not here repeat the description which I have given in my Journal (p. 31) of the bisection of the *P. Tasmaniana*, and the production of two perfect individuals (with the exception of the external orifice for the mouth-sucker) in the course of twenty-five days. I will only add, that an individual being divided into many fragments, each crawled in the proper direction, as if furnished with its proper anterior extremity.

I found altogether twelve terrestrial species; two in the forests of Brazil; three on the grassy, open country northward of the Rio Plata; one on the arid hills near Valparaiso in Chile, and three in the damp wooded country southward of central Chile: the most southern locality was in lat. 46° 30′ S. I found also one species in New Zealand (which I lost), another in Van Diemen's Land, and a third at the Mauritius; the latter I had not time to examine. Hence it appears that the terrestrial section of this genus is widely diffused; but as far as is at present known, only in the southern hemisphere. The existence of terrestrial *Planariæ* is analogous to that of terrestrial leeches in the forests of southern Chile and of Ceylon.

1. *Planaria vaginuloides.*

Alimentary orifice situated at two-thirds of the entire length of the body from the anterior extremity; width of orifice $\frac{1}{60}$th of an inch: at the distance of $\frac{3}{10}$ths of an inch posteriorly, lies the genital orifice, very plainly marked. Ocelli numerous, placed at regular intervals on the anterior extremity; irregularly, round the edges of the foot. Anterior part of the body elongated, with the extremity much pointed and grooved on the under side: tail bluntly pointed; body convex, flattened on the top. Sides and foot coloured dirty "orpiment orange*"; above, with two stripes on each side of pale "primrose-yellow," edged externally with black; on centre of the back a stripe of glossy black; these stripes become narrow towards both extremities. Length when fully extended $2\frac{3}{10}$ths of an inch; breadth in broadest part $\frac{15}{100}$ths of an inch.

Hab. Under the bark of a decayed tree in the forest: Rio de Janeiro (June).

2. *Planaria elegans.*

Position of the orifices as in *P. vaginuloides*. Anterior part of the body little elongated. Ocelli absent on the anterior extremity, and only a few round the margin of the foot. Colours beautiful; back snow-white, with two approximate lines of reddish brown; near the

* The colours, when placed between inverted commas, signify that they are given by comparison with Patrick Syme's Nomenclature.

sides with several very fine parallel lines of the same tint; foot white, exteriorly clouded, together with the margin of the body, with pale blackish purple: body crossed by three colourless rings, in the two posterior of which the orifices are situated. Length 1 inch; breadth more uniform, and greater in proportion to length of body, than in the last species.

Hab. Same as in *P. vaginuloides*.

3. *Planaria pulla.*

Mouth-sucker, when protruded and contracted in spirits of wine, globular. Ocelli numerous, placed at regular intervals on the anterior part of the body. Body slightly flattened, gradually increasing in width from the anterior extremity, which is much pointed and grooved beneath. Back rich "umber-brown," with a central narrow streak of "broccoli-brown" reaching entire length: foot broccoli-brown, with two clear spaces for the orifices. Length when fully extended $1\frac{9}{10}$ths of an inch; breadth $\frac{1}{10}$th of an inch.

Hab. Very frequent under stones: Monte Video and Maldonado (June and August).

4. *Planaria bilinearis.*

Ocelli numerous, placed at regular intervals. Body subcylindrical, narrow, of nearly uniform breadth. Colour above pale dirty yellow with two stripes of "umber-brown," which become narrower and unite at the two extremities. Length when fully extended $1\frac{3}{10}$ths; breadth $\frac{7}{100}$ths of an inch.

Hab. Same as *P. pulla* (June and August).

5. *Planaria nigro-fusca.*

Alimentary orifice situated at rather less than two-thirds of the entire length from the anterior extremity: genital orifice, with the body contracted, is situated at the $\frac{25}{100}$ths of an inch posteriorly. Ocelli very numerous; those on the extreme tip very minute and placed at regular intervals; those on the margin of the body grouped by two and three together. Body much depressed, tapering suddenly towards the anterior extremity; tail abruptly terminated in a point. Above uniform blackish brown, beneath pale. Length when fully extended 2 inches; breadth $\frac{3}{10}$ths of an inch.

Hab. Under rotten wood: Maldonado (May).

6. *Planaria pallida.*

The alimentary and genital orifices $\frac{2}{10}$ths of an inch apart, when the body is partially contracted: mouth-sucker when dissected out of the body $\frac{15}{100}$ths of an inch in length; its margin very sinuous. Ocelli numerous; eleven close together, being placed on the anterior extremity; and the others in groups of two and three on the sides, and chiefly on the anterior half of the body. Body much depressed and flat, with both extremities finely pointed. Upper and lower surfaces white, with the pinkish intestinal vessel seen through. Length when crawling 3 inches; breadth $\frac{2}{10}$ths of an inch.

Hab. Under stones on the dry hills near Valparaiso (July).

7. *Planaria elongata.*

Alimentary and genital orifices obscure. Ocelli absent: posterior extremity very obtusely rounded. Above "umber-brown," with a narrow medial line of darker brown; sides narrowly edged with pale brown, bordered with the umber-brown; beneath pale brown. Length when crawling 5 inches, when closely contracted $1\frac{4}{10}$ths of an inch, breadth when crawling $\frac{15}{100}$ths, when contracted $\frac{4}{10}$ths of an inch.

Hab. On rotten wood in mountain-forests: C. Tres Montes, lat. 46° 30′ S., Western America (December).

8. *Planaria semilineata.*

Body convex. Above greenish black, with minute white punctures; on anterior half of body four parallel bands of "gall-stone yellow," of which only the central and approximate pair are prolonged into the posterior half of body: foot leaden colour, with colourless spaces for the orifices.

Hab. Under stones, on one of the Chonos Islands (north of C. Tres Montes) (December).

9. *Planaria maculata.*

Edges of the body very thin; breadth nearly uniform. Upper surface quite black, with numerous, oblong, variously sized spots of yellow: foot mottled white and black. Length when crawling $1\frac{7}{10}$ths; breadth $\frac{2}{10}$ths of an inch.

Hab. Forest of Valdivia (February).

10. *Planaria Tasmaniana.*

Mouth-sucker widely extensile: alimentary orifice placed nearly in centre of the body; genital orifice $\frac{1}{10}$th of an inch posteriorly, but when the animal crawls it is $\frac{2}{10}$ths of an inch distant. Genital orifice very distinct, submargined. Ocelli scattered round the entire margin of the foot, but most frequent at the anterior extremity. Both extremities pointed. Colour dirty "honey-yellow," with a central dark brown line bordered on each side with a broader line of pale "umber-brown:" foot quite white. Length when crawling $1\frac{5}{10}$ths; when contracted $\frac{8}{10}$ths of an inch.

Hab. Beneath decayed trees in the woods of Van Diemen's Land: frequent (February).

I will now briefly describe five marine species of *Planaria*, which are remarkable, either as presenting novel points of structure, hereafter probably forming the types of new subgenera, or from the situations which they inhabit.

1. *Planaria*(?) *oceanica.*

PLATE V. fig. 1. Under-surface magnified.

Anterior extremity neck-shaped, with two ear-like processes.

Ocelli, I believe, absent. Posterior extremity broadly rounded. Membranous margin of body jagged. Length $\frac{2}{10}$ths of an inch. Colour pale, uniform. Near the neck there is a quadrangular, internal, clear space, apparently lined by a membrane, within which there is a dark-coloured spot, and externally close by it an orifice, which the animal can dilate and contract at pleasure. Close behind this there is an internal oval space, within which there is a second dark spot united to a delicate vessel; I was unable to distinguish any orifice near this point: these organs form, I presume, the reproductive system. Close behind these organs there is a dark space formed by the union of eleven, branching, intestinal cavities, in the centre of which there is a longitudinal orifice situated rather behind the centre of the body. Through this orifice the animal can protrude a folding mouth-sucker: when it begins to unfold it is seen to be drawn into eight folds, as represented at (B).

Hab. Open ocean, lat. 5° S., long. 33° W. (February).

This I believe is the first instance of a species of this genus being found in the open sea, at the distance of 150 miles from the nearest part of S. America, and 80 miles from the small island of Fernando Noronha.

2. *Planaria* (?) *formosa.*

Body much depressed, oval. In the posterior half, on the under side, there is a very large alimentary orifice with folding lips (but apparently with no exsertile mouth-sucker), from which the two main intestinal cavities branch. Near the anterior extremity there is a minute orifice, and between it and the mouth a second orifice: these the animal can dilate and contract; they lie over an opake, wedge-formed, internal mass, and form, I presume, two genital orifices. Back dotted with purplish red, with a central band of "vermilion-red," edged with white: this band sends off three branches on each side; at the extremity of each of the two anterior branches there is a longitudinal group of black ocelli, and before these two other circular groups, forming together four groups of ocelli. Length when extended half an inch. Inactive in its movements.

Hab. On corallines, at a depth of 30 fathoms, in southern Tierra del Fuego (December).

3. *Planaria* (?) *macrostoma.*

Plate V. fig. 2. Under-side magnified.

External alimentary orifice situated in the posterior half of body: mouth-sucker nearly subcylindrical, bell-shaped, very long; when contracted within the body it lies in a serpentine position; when partly protruded it has the figure as represented; when fully extended it tapers only slightly from its mouth to its base, and is so long, that the animal can pass it from the under surface over the entire width of its back. Its base is united, in the middle of the body, to the three principal branches of the intestinal cavity; the two posterior branches unite and form a ring, enclosing the space in which the

mouth-sucker and its external orifice are situated. The three main branches receive the moss-like subdivision of the intestinal cavity, which reach all round nearly to the margin of the body. The main, medial, intestinal cavity ends at the anterior extremity in a small, opake, wedge-formed mass; on each side of which, nearly on the dorsal surface, a black ocellus is situated. Between the lateral branches on each side of the medial cavity, seven or eight internal spherical cavities lie, including opake balls, which I presume are immature ova; the anterior ones were most developed: they were not present in the smaller specimens, or in all the full-grown ones. I was unable to discover any genital orifice, though no doubt one or two exist: near the posterior extremity (at B) there was a colourless space, but I could not see any orifice. Anterior extremity square, truncate, with the edges thin and prehensile; the animal attaches itself by this part, almost like a leech with its sucker, and thus drags its body: posterior extremity broadly rounded. Above, faintly coloured brownish purple in striæ, with a colourless space over the alimentary orifice. Length $\frac{2}{10}$ths; breadth $\frac{6}{100}$ths of an inch.

Hab. Congregated in numbers under stones, in *brackish water*; Chonos Archipelago (west coast of S. America) (December).

The arrangement of the main branches of the intestinal cavity is the same as in the terrestrial *Planariæ*, with the exception of the two posterior branches being united near the extremity of the body into a ring, which structure I have not met with described in any other species. Hence this species probably ought to form the type of a new subgenus. I may here mention that I found amongst these islands an elongated marine species (with a very distinctly formed head placed on a narrow neck) which had the power of crawling either backwards or forwards,—a power I have never seen in any other species.

4. *Planaria* (?) *incisa*.

Plate V. fig. 3. Under-surface magnified.

Body oval, very much depressed, highly contractile; margin sinuous, anteriorly deeply indented, posteriorly less so. Ocelli very numerous and crowded together in several rows on the indented anterior (as is known by its progression) margin. Along the centre of the body an intestinal vessel extends, and in the middle of this (B) there is a well-closed orifice, through which the animal can protrude a thin, much-folded, sinuated mouth-sucker; this when fully expanded is quite as wide as the body. Posteriorly, on each side of the central vessel, there is a mass, apparently of immature ova. Near the posterior extremity there is a second subterminal orifice (D), through which, when the animal was placed in spirits, a little globular mass was protruded, like a small, much-contracted mouth-sucker. Near to the anterior extremity there are two slightly retractile paps with orifices, of which the anterior one is the largest. From this point diverging rays (intestinal cavities?) are sent off, which reach nearly

to the margin of the entire body: when the animal contracts itself, the back is raised in slight ridges, corresponding with these rays. This species, therefore, has four orifices on its under surface. Back finely reticulated with brownish purple. Length 1 inch; breadth three-quarters of an inch.

Hab. Under stones on the sea-beach, St. Jago; Cape Verd Archipelago (February).

This species is exceedingly active and irritable in its habits: it lives, like a *Nereis*, under stones firmly imbedded in the beach at low-water mark. It has the power of adhering with great tenacity to smooth stones: another allied species had the same power, could also swim well by a vertical movement of its body, and frequently rolled itself into a ball.

With respect to the four orifices: I presume, as in the *P. formosa*, the two anterior ones belong to the reproductive system. The central orifice undoubtedly is the mouth: the posterior one would naturally be thought to be the anus; but I am doubtful of this, considering the little globular body which was protruded through it, and from the existence in the following allied genus of a double mouth.

Diplanaria (nov. genus).

Alimentary orifice double, with two exsertile mouth-suckers. Two genital orifices in the posterior part of the body. A large forked ovarium (?). Ocelli in four groups, two superficial and two more deeply seated. The characters here given appear to me absolutely to require the institution of a new genus.

Diplanaria notabilis.

Plate V. fig. 4. Under-side magnified.

Body very much depressed, with the edges very thin; anterior extremity thrice as broad as the posterior. On the under surface, towards the anterior extremity, there is a clear space, over which, on the back, the ocelli are situated; into this space, on all sides, the branching, clear, intestinal cavities enter. Each intestinal cavity generally bifurcates three times before its fine extremities reach the margin of the body. Towards the posterior extremity there is a second clear space (with the two orifices D and E), into which also the surrounding intestinal branching cavities enter; these two spaces are united by two longitudinal clear spaces (obscured by ovules in the drawing) passing on each side of the elongated, opake, white, central organ. This organ, when the animal is contracted, has the appearance represented in the drawing, namely of an internal, elliptic mass, narrowing at each end, with deeply sinuated borders, and with two external, perfectly closed orifices over it, as shown at (B) and (C). But when these two orifices are opened, from both of them broad, shallow, saucer-like mouth-suckers are protruded, as represented at (F); these, when contracted within the body, appear united,

and form a single, elliptic, sinuated body. These two mouth-suckers are quite similar; they are much shallower than those of any other species of the family which I have seen; their membranous edges are very thin, narrow, transparent and sinuous: in the act of contraction they become folded in a complicated manner, like the bud of a flower. I was able easily to dissect them out of the body, and they retained, in the characteristic manner described by Dugès, and as in the terrestrial *Planariæ*, an extreme degree of irritability and contractile power, long after the rest of the body had ceased to live.

In the elliptic space surrounding the two mouth-suckers when contracted, and between the mouths of the lateral, branching, intestinal cavities, innumerable ova are arranged in groups, from two to four in each; these are represented in the drawing only by double dots. These ova were easily separated; they are spherical, $\frac{3}{100}$ths of an inch in diameter, and contain a central opake mass. In the posterior clear space there are two minute, but quite distinct, orifices (D and E), which I do not doubt are the reproductive pores: into this clear space a large fork, filled with opake white matter, enters, as is shown in the drawing; this matter consists of minute, white globules in chains, imperfectly united together: I believe these are immature ova, and hence I suppose that the fork is the ovarium, from which the ova pass into the clear spaces surrounding the mouth-suckers and are there matured.

The ocelli are black and circular, and are arranged in four groups, two of which are round, and two in elongated bands inclined to each other: the ocelli in the bands are not seated on the dorsal surface, but deep within the body, near the ventral surface. Colour pale "tile-red," darkest on the dorsal ridge, with colourless spaces over the genital orifices and over the ocelli. Length $\frac{55}{100}$ths of an inch; breadth of anterior part of body $\frac{3}{10}$ths; of posterior part $\frac{1}{10}$th of an inch.

Hab. Under stones in tidal pools, Chonos Archipelago (Western S. America) (December).

This animal is very active, can crawl quickly, and can swim well by the movements of its thin marginal edges: it can adhere firmly to stones.

This is the most complicated and singular form of the large family of *Planariæ* which I have seen or met with described. The presence of two alimentary orifices and two mouth-suckers is another and interesting point of affinity between the *Planariæ* and the true parasitic worms, in which the number of mouths so often exceeds one. I believe that the presence of the large forked ovarium, and of groups of ocelli situated at different depths, are peculiarities of structure confined to this genus. If the small mass protruded from the posterior orifice (D) of the *Planaria* (?) *incisa* was really a small contracted mouth-sucker, this species is closely allied to our present new genus; with the chief difference of the two genital orifices being near the anterior, instead of the posterior extremity.

I will conclude by remarking, that the family of *Planariæ* is most widely diffused, and is adapted to the most different stations: on the land, it is adapted to forests and plains, in hot, temperate, and dry climates; in water, under all latitudes, to fresh, brackish and salt, on sea-beaches, at the depth of 30 fathoms, and in the open ocean.

XXX.—*Catalogue of Irish Entozoa, with observations.* By O'Bryen Bellingham, M.D., Fellow of and Professor of Botany to the Royal College of Surgeons in Ireland, Member of the Royal Zoological, Geological and Natural History Societies of Dublin, &c.

[Continued from p. 165.]

Genus 17. Bothriocephalus.

(Derived from *βοθριον, fovea,* and *κεφαλη, caput.*)

Gen. Char.—Body long, flat, soft, and articulated. Head subtetragonal, with two or four opposite depressions.

The genus *Bothriocephalus* was established by Rudolphi, and has been adopted by all zoologists since. Previous to his time the species were confounded with those of the genus *Tænia.*

The species are common in fish and birds, more rare in the mammalia, and very rare in reptiles; they usually inhabit the alimentary canal, sometimes the abdominal cavity. The genus is not very numerous in species, only thirty-four being enumerated by Rudolphi, of which ten are doubtful. He has arranged them in two subdivisions; in one the head is armed, in the other this part is naked or unarmed.

A. Inermes.

a. *Dibothrii.*

1. *Bothriocephalus latus* *.. Small intestines of man (*Homo*).
2. ——————— *claviceps.* Intestines of eel (*Anguilla acutirostris*).

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* We are indebted to Bonnet for the first description approaching to accuracy of the *Bothriocephalus latus*; but it is only within a few years that its zoological characters have been properly understood, and we are indebted to Bremser for having first determined these, who removed it from the genus *Tænia,* to which it had long erroneously been supposed to belong.

The *Bothriocephalus latus* is the only species of the genus which inhabits the human intestines, and it has received a number of different names. It is the *Tænia lata* of Linnæus, Pennant and Turton; the *Tænia* 'articulos non demittens' and the *Tænia* 'à anneaux courts' of earlier writers; the *Tænia vulgaris* and *Tænia grisea* of others; the *Tænia inerme umana* of Brera; the *Tænia osculis superficialibus* of

3. *Bothriocephalus proboscideus* *.
- Intestines and pyloric appendages of salmon (*Salmo Salar*).
- Pyloric appendages of salmon trout (*Salmo Trutta*).
- Intestines of Gillaroo trout (*Salmo Fario*, var.).

Hooper; *le Tænia large* of Cuvier; and *le Bothriocephale de l'homme* of Lamarck.

The colour of this species is white, seldom however so pure a white as the *Tænia solium*. After it has remained in spirits of wine it often acquires a grayish tinge, from which circumstance Pallas gave it the name of *Tænia grisea*.

The head has somewhat an ovoid shape; the neck is in general not distinct. The articulations of the body are very broad in proportion to their length. The orifices which lead to the ovaries are situated in the centre of the flat surface of each articulation, and around them the oviducts are seen, which have a radiated or stellate appearance. In some instances we can distinguish a minute body projecting from the genital pore, which is supposed to be the male organ.

The *Bothriocephalus latus* inhabits exclusively the small intestines, and as many as three or four have been found in the same individual. Its length is variable, but is said to be in general greater than that of the *Tænia*. It seldom or never parts with single joints (as occurs with the *Tænia solium*), owing to the longitudinal muscular fibres being continued from one articulation to another; in the *Tænia solium* these fibres are distinct in each articulation.

The *Bothriocephalus latus* is not uncommon in the intestines of the inhabitants of Poland, Russia, and part of France. It is so general in some parts of Switzerland as to have received the name 'Ver de Genève.' It is very rare in England, Germany, Holland, India, Egypt and the United States, where it is replaced by the *Tænia solium*. The only specimen which I possess is a portion of one found in the intestines of an individual who died several years ago in one of the Dublin hospitals, which was given to me by my friend Dr. Aquilla Smith of this city. I have only heard of two other instances in which it has occurred in Dublin; once it was met with by the late Dr. Macartney, and once by Dr. Graves, but I have had no opportunity of examining the specimens in either case.

* The *Bothriocephalus proboscideus* is exceedingly common in the genus *Salmo*; it is a very beautiful species, and will live for several days after the death of the animal which it inhabits. It abounds most in the largest and fattest salmon. I have found them in such numbers in the intestines and pyloric appendages of the *Salmo Salar* as almost completely to block up these parts, which contained nothing besides but a white tenacious mucus. The fish in which they were most numerous were amongst the finest in the market; which would help to prove, that in these animals at least, the pre-

4. *Bothriocephalus infundibuliformis* ? *	Intestines and pyloric appendages of salmon trout (*Salmo Trutta*).
5. ———— *microcephalus* †	Intestines of sun-fish (*Orthagoriscus Mola*).

sence of entozoa in the alimentary canal is not to be regarded as the result of disease.

* In the intestines and pyloric appendages of the salmon trout (*Salmo Trutta*) I have, upon several occasions, found a *Bothriocephalus* which has many of the characters of *B. infundibuliformis*. It resembles generally the *B. proboscideus*, but differs from it in some respects.

The length is about 12 inches or upwards; colour white; body thick; diameter a third of a line anteriorly, 2 lines posteriorly. The head is large, triangular or subsagittate; the depressions (*bothrii*) deep and of an oblong shape. The neck is very distinct, and has a greater diameter than the articulations immediately next to it; the articulations near the neck are somewhat funnel-shaped; in the rest of the body each second joint is more than double the length of that before it; near the posterior extremity all the articulations are short; the terminal joint is twice or three times the length of those anterior to it, and is rounded at its extremity. A depressed median line is seen upon the body running its whole length.

When the animal is alive and in motion the shape of its head varies much, and when protruded fully it presents nearly the same character as after lying in spirits of wine; at other times the bothrii resemble merely two longitudinal lines; when the animal is very much contracted, the head resembles a rounded tubercle, with two circular depressions upon its anterior surface. In a large specimen now before me the head has a much greater diameter than the articulations nearest it, its base being nearly double their width. The bothrii are enlarged, contracted and elongated constantly; and when the body is fully contracted the animal appears to be almost cylindrical.

† In the intestines of a very large sun-fish (*Orthagoriscus Mola*) which I examined, and which is now in the museum of the Natural History Society of Dublin, I found an immense number of the *Bothriocephalus microcephalus*, several of which lived in a vessel of fresh water for twenty-four hours.

The longest measured upwards of 3 feet in length; at the widest part of the body it was something more than 3 lines in diameter. Colour white. The head is small, triangular or sagittate, and terminates anteriorly in a little papillary eminence. The bothrii, two in number, are of an oval shape, though wider posteriorly. There is no neck. The anterior articulations are funnel-shaped, becoming longer gradually; the next are shorter; the terminal articulations appear to be merely transverse rugæ in some specimens; the last articulation is more acute than the others. This species is believed to be peculiar to the sun-fish.

6.	*Bothriocephalus punctatus**.	Intestines of turbot (*Pleuronectes maximus*). Intestines and pyloric appendages of sea-scorpion (*Cottus Scorpius*).
7.	——— *solidus*†..	Abdominal cavity of stickleback (*Gasterosteus aculeatus*).

* The *Bothriocephalus punctatus* is very common in the intestines of the turbot (*Pleuronectes maximus*), and of the sea-scorpion or father-lasher (*Cottus Scorpius*). Dr. Drummond has found it in addition in the brett or brill (*Pleuronectes rhombus*), and it has been very accurately described by him in the New Series of the 'Mag. of Nat. Hist.' for the year 1839. I shall therefore only observe here, that the peculiarity in this species which is noticed by Rudolphi was apparent in my specimens, viz. that this animal when recent is perfectly white, but after having remained for some time in spirits of wine or in water, a black spot appeared in the centre of each articulation in the situation of the ovaries. My friend Dr. Drummond has also noticed this circumstance, and considers that it is connected in some way with the maturity of the ova.

† Although I have examined a large number of the *Gasterosteus aculeatus*, I have not succeeded in finding the *Bothriocephalus solidus*, and have placed it in this list on the authority of my friend Dr. Allman, the Professor of Botany in Trinity College, Dublin, who discovered it in specimens of the *Gasterosteus aculeatus* from the neighbourhood of Cork. Its habitat differs from that of most species of *Bothriocephalus*, as it occurs only in the cavity of the abdomen, not in the intestinal canal. The animal which it inhabits would appear sometimes to have the power of getting rid of it, as the *B. solidus* has been found alive in the water of ponds in which these fish are abundant. It is probable that from this circumstance Linnæus was led to the opinion that the *Tænia* (to which genus it formerly was supposed to belong) could exist out of the bodies of living animals. Dr. Baer relates, that "in an excursion up the Pregel with the late Prof. Eysenhandt in search of water-plants, the first object which attracted our attention was a tape-worm; on continuing our searches we found nearly a dozen in the water, four of which were alive, the others dead or nearly so. This (he adds) brought to my recollection Linnæus's *Tænia*, found in water. With the exception of vast numbers of the *Gasterosteus pungitius*, scarcely any other animal was observed in the water. Many of these fish were taken; in all the abdomen appeared much swollen, and on opening them a *Bothriocephalus solidus* was found, which, when extended, was longer than the fish in which it was contained. Every specimen of fish we opened contained a worm, and the fishermen assured us that they were rarely met with without them. It is supposed that these worms escape, or are forced from the fish into the water, in which they will live for a considerable time."

8. *Bothriocephalus nodosus* .. { Small intestines of pomarine skua (*Lestris pomarinus*). / Small intestines of dusky grebe (*Podiceps obscurus*).

b. *Tetrabothrii.*

9. *Bothriocephalus macrocephalus**. { Small intestines of second-speckled diver (*Colymbus septentrionalis*). / Small intestines of horned grebe (*Podiceps cornutus*).

10. ——— *tumidulus*.... Intestines of skate (*Raia Batis*).

B. Armati.

(*Omnes tetrabothrii.*)

a. *Uncinati.*

11. *Bothriocephalus coronatus.* Large intestines of skate (*Raia Batis*).

b. *Proboscidei.*

12. *Bothriocephalus corollatus.* { Stomach, small and large intestines of dog-fish (*Squalus Acanthias*).

13. ——— *paleaceus* . { Large intestines of dog-fish (*Squalus Acanthias*).

Species dubiæ.

14. *Bothriocephalus* †. { Intestines and pyloric appendages of cod (*Gadus Morrhua*). / Intestines and pyloric appendages of haddock (*Gadus Æglefinus*).

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* Upon several occasions I have found the *Bothriocephalus macrocephalus* in large numbers in the small intestines of the second-speckled diver (*Colymbus septentrionalis*). They usually were most abundant in that part of the intestinal canal near the gizzard; none existed in the large intestines. They are from 2 to 6 inches and upwards in length; colour white; the articulations very readily separate from one another when the animal is placed in water. The head is large, and somewhat tetragonal in shape, with four lateral depressions, two upon each side; each is contracted in the centre of the long diameter, which gives it the appearance of being divided into two portions. The neck is very short; in some the greatest diameter of this part was next the head, in others next the body. The articulations in front are almost linear; they then increase in length and eventually become campanulate.

† The species of *Bothriocephalus* which inhabits the intestines and pyloric appendages of the cod (*Gadus Morrhua*) and of the haddock (*G. Æglefinus*) is exceedingly common. I have seldom examined one of these fish without finding it, and yet it has been altogether overlooked by Rudolphi and other writers. That it is a *Bothriocephalus*

15. *Bothriocephalus* . Large intestines of skate (*Raia Batis*).
16. ————*. Small intestines of little grebe (*Podiceps minor*).
17. ————. . Intestines of arctic tern (*Sterna arctica*).
18. ————.. Large intestines of red-necked grebe (*Podiceps rubricollis*).

appears from the disposition of the ovaries, but I have never succeeded in detecting the bothrii upon the head; in fact this part is inclosed in a kind of tubercle which is found upon the peritoneal surface of the pyloric appendages (the body of the animal lying loose in the intestines), and I have drawn this part out to a very fine point, but have not been able to determine its characters. My friend Dr. Drummond has also found this species in abundance in cod taken in the neighbourhood of Belfast.

* In the intestines of the little grebe (*Podiceps minor*) I found several specimens of a *Bothriocephalus* which does not appear to have been described, and which seems to unite the genus *Ligula* with the *Bothriocephalus*. It belongs to the first division in Rudolphi's arrangement, *Inermes*, and to the subdivision *Dibothrii*. The length is from an inch and a half to two inches; colour when recent reddish yellow. The head is somewhat subsagittate; the bothrii, two in number, are placed, one upon the dorsal, the other upon the abdominal surface of this part; they are long, slightly elliptical, or in the form of a simple fissure, extending the whole length of the head and reaching into the articulation next it. There is no neck. The articulations are broad, rugose, and very short. In the centre of the posterior articulations the circular orifices of the ovaries are seen, from each of which a *lemniscus* projects, which is long and clavate.

XXXI.—*On the British* Desmidieæ. By John Ralfs, Esq., M.R.C.S., Penzance*.

[With a Plate.]

Tetmemorus, n. g.

Frond simple, elongated, straight, cylindrical or subcylindrical, slightly constricted in the middle; segments emarginate at the end, but otherwise quite entire.

I have instituted this genus for the reception of two plants which are placed in *Closterium* by Meneghini, but do not well agree with the other species in that genus.

The fronds are elongated as in *Closterium*, from which, however, this genus may easily be distinguished by the emarginate ends; the same character and the elongated fronds will separate it from *Cosmarium*.

From *Euastrum*, with which it agrees in the emarginate extre-

* Read before the Botanical Society of Edinburgh, April 11, 1844.

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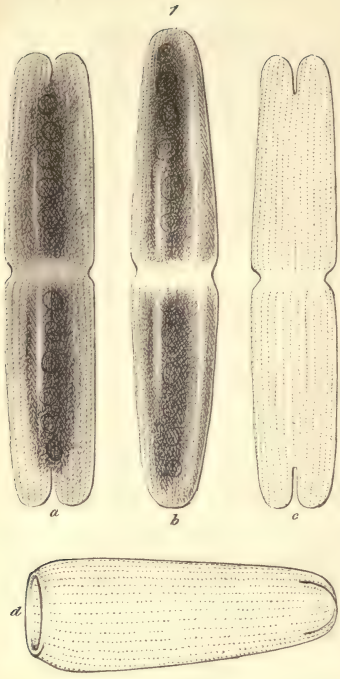
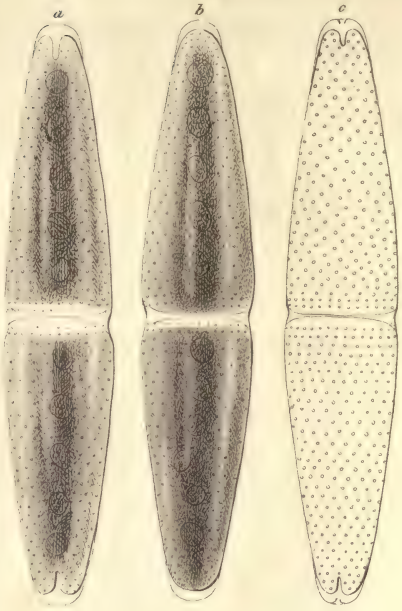
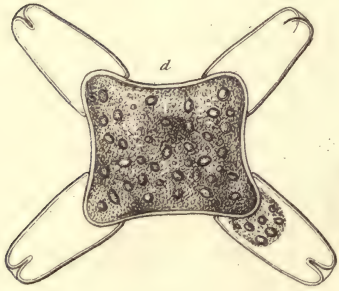
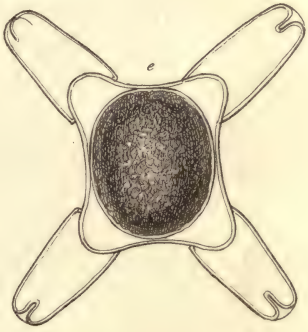
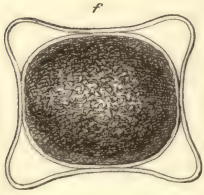
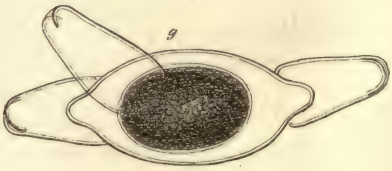












Tetrmemorus.

F.Ralfs & E.Jenner del.

J.D.C.Sowerby sculp.

mities, it differs in being cylindrical or nearly so, and in the segments being neither lobed nor sinuated; the fronds are also free from inflated protuberances.

Starch is found in both species.

1. *T. Brebissonii.* Segments in the front view with parallel sides, but in the lateral view attenuated; the ends without any projecting processes. *Closterium Brebissonii*, Mngh. Syn. Desmid. in Linnæa 1840, p. 236. *Closterium* —— (sp. 9), Bailey, Amer. Bacil. in Amer. Journal of Science and Arts, vol. xli. no. 2. pl. 1. fig. 38.

Ashdown Forest, Warbleton, Henfield, &c., Sussex, and near Tunbridge Wells, *Mr. Jenner*; Dolgelley, Carmarthen and Penzance.

Fronds about six times longer than broad, with a slight constriction in the middle; the front view shows the lateral margins of the segments nearly straight, with rounded and emarginate ends. The lateral view is more constricted in the middle, and the segments are attenuated towards the end.

The endochrome is dark green, and there is a series of large globules down the middle in a single row, either straight or with some irregularity.

The fronds, when empty, are found to be minutely punctate, the puncta being arranged in longitudinal rows.

This species differs from the following one in having its front and lateral views unlike each other, and its puncta arranged in longitudinal lines.

Plate VIII. fig. 1. *Tetmemorus Brebissonii*: *a*, front view; *b*, side view; *c*, empty frond; *d*, segment.

2. *T. granulatus.* Fronds tapering both in the front and lateral views, and ending in a colourless projecting lip-like process. *Closterium granulatum*, Breb. in Mngh. Synop. Desmid. p. 236.

In boggy pools, Ashdown Forest and Henfield, Sussex; bogs at Fisher's Castle near Tunbridge Wells, *Mr. Jenner*; Dolgelley and Penzance.

Fronds cylindrical, about six times as long as broad, very slightly constricted in the middle, fusiform. The extremities always have a colourless projecting lip-like process which extends beyond the notch.

The colouring matter is dark green, and a few large green globules are arranged in a longitudinal row down the middle.

The empty frond is minutely punctated; the puncta generally form one or two transverse lines in each segment near the central constriction, and in the other parts of the frond they are not in rows, but scattered.

Under a low power of the microscope this species much resembles the preceding; but it may always be distinguished by the front and lateral views being similar and only differing in the

terminal notch, which is not seen in the lateral view. There is also beyond the notch a remarkable lip-like projection which is wanting in *Tetmemorus Brebissonii*, and the puncta seen in its empty frond are not arranged in longitudinal rows.

Plate VIII. fig. 2. *Tetmemorus granulatus*: *a*, front view; *b*, side view; *c*, empty frond; *d*, fronds conjugated; *e*, spore fully formed; *f*, spore separated from the segments; *g*, side view of conjugate fronds.

P.S.—Since the preceding was written I have met with this species in a conjugated state. The specimens were gathered near Dolgelley, and formed a mucous stratum on the moist soil.

The fronds were smaller than usual; I did not observe any in the first state of union, but it appears that after conjugation the segments of the fronds are separated by the formation of a large, quadrate, central cell, in which all the endochrome of both fronds is collected and the empty segments remain loosely attached to the corners of this cell. The endochrome at first fills the cell, large starch globules being scattered throughout the minutely granular substance, but at length it becomes a dense, round, homogeneous spore of a dark green colour which finally changes to an olive-brown. In this stage the segments of the original fronds fall off, leaving the quadrate cell inclosing the spore.

In the front view, as stated above, the cell is nearly square, the sides are concave, and the angles rounded and slightly produced. A lateral view shows that the cell and spore are both compressed.

This is the first opportunity I have had of examining any of this family in a conjugated state, and I have described it at some length because it appears to me a very interesting and important fact in support of their claim to belong to the vegetable kingdom, exhibiting in the present instance a striking similarity to the change which takes place during the formation of similar spores in *Staurocarpus* among the *Conjugatæ*.

In *Staurocarpus* after conjugation a subquadrate cell is formed, within which the endochrome is collected. The latter is at first of the same form as the cell, but in one species at least is at length condensed into a large, compact, globular spore, and in every species the cell with the contained spore finally separates entirely from the filaments with which it is connected. In this separate state I know no character by which to distinguish the spore of the *Tetmemorus* from one belonging to a species of *Staurocarpus*; and in both, the spore, when tested by the tincture of iodine, is found to be almost wholly composed of starch*.

* Examples of the shape of the cell in species of *Staurocarpus* may be seen in the plate illustrating Mr. Hassall's valuable papers on the Freshwater Algæ.—Annals of Nat. Hist. vol. xii. pl. 7.

MICRASTERIAS, *Ag.* (*Meneghini*).

Fronds simple, plane, orbicular, deeply divided into two segments, each of which is lobed; the lobes are radiant and inciso-serrate.

The fronds are simple, circular, flat, divided nearly to the centre, so that the segments are united only by a narrow chord. The segments are semiorbicular and in close contact with each other along their entire breadth; each is deeply divided into lobes which are arranged in a radiant manner; each lobe is regularly and deeply cleft, and the margin is dentate.

The orbicular, plane, and deeply incised fronds will distinguish this from all the other genera in this family. In *Euastrum*, the only one with which it can be confounded, the fronds are generally oblong, and the lobes are not incised.

Starch granules are very evident in this genus. Young fronds differ so much in appearance from the full-grown plant, that they may be mistaken for another species.

As the plants to which Agardh affixed the name of *Micrasterias* are probably all included under the above description, I have followed Meneghini in retaining that name for this genus, especially as it seems to me that not one of Agardh's species is contained in the *Micrasterias* of Ehrenberg, who intended by it a very different genus, the *Pediastrum* of Meyen*.

1. *M. rotata.* Fronds smooth; lobes broadly cuneate, approximate, the end lobe emarginate, the others deeply incised, the divisions notched and dentate. *Micrasterias rota*, Mngh. Syn. Desmid. in Linnæa 1840, p. 215. *Echinella rotata*, Grev. in Hook. Br. Fl. vol. ii. p. 398 (1830). *Eutomia rotata*, Harv. Br. Alg. p. 187. *Euastrum rota*, Ehr. Infus. p. 167. tab. 12. fig. 1; Pritch. Infus. p. 195. figs. 121 to 123; Bailey, American Bacillaria, pl. 1. fig. 22 and fig. 24. *Micrasterias*, Ag. Bot. Zeit. 1827?

In freshwater pools, probably common. Sussex, near Southampton, &c., *Mr. Jenner*; Henfield, *Mr. Borrer*; frequent about Barmouth, *Rev. T. Salwey*; Dolgelley, Cwm Bychan, Carnarvon; Carmarthen, Swansea; Dartmoor and Penzance.

This plant is not uncommon, and frequently occurs in considerable quantities, and unmixed with other algæ.

The fronds are large, and appear to the naked eye like minute green dots; they are nearly circular; each segment is deeply divided into five lobes. The end lobe is the narrowest, and in the

* "Nomen a cl. Agardh propositum et perperam ab aliis Pediastris affixum, et cum novo illo Euastrum commutatum servandum."—Menegh. Syn. Desmid. in Linnæa 1840, p. 215.

mature plant appears more turgid than the rest of the segment; the other lobes are deeply bifid. All the lobes, as well as the divisions of each lobe, are cuneate; all the incisions have their sides approximate and point towards the centre of the frond. The margin of the frond is dentated and is frequently colourless.

The young frond differs considerably from the adult form: its terminal lobes are very broad with convex and entire margins, whereas the other portions are dentate or spinulose-dentate at their margins; the lobes not being yet divided there are no incisions, or very short ones, whilst a slight notch often points out the future clefts; the younger the frond the more entire is its margin.

As in this plant the portion connecting the two segments is very narrow, the mode of increase by division is well shown. The central connecting portion elongates and becomes converted into two colourless rounded lobules, which increase in size, gradually acquire colour, and finally become lobed and miniature representations of the segments of the frond, and then two new fronds are formed by separation.

The new segments frequently acquire considerable size before they become lobed. As two fronds are formed by separation before the new segments are fully grown, specimens often occur in which the segments differ in size, and the lobes of the smaller one are sometimes not fully formed.

Plate VI. fig. 1. *Micrasterias rotata*: *a*, full-grown fronds; *b*, young fronds; *c*, mode of increase.

Micrasterias apiculata, Mngh., which differs from this species in having its surface furnished with spines, has not been detected in this country.

2. *M. Melitensis*, Mngh. Frond smooth, all the lobes deeply bifid; the divisions linear and bidentate at the extremity; both the lobes and their divisions are divergent. Mngh. *l. c.* p. 216. *Euastrum Crux Melitensis*, Ehr. Infus. p. 162. tab. 12. fig. 3; Pritch. Infus. p. 196. fig. 124; Bailey, *l. c.* fig. 23 and fig. 29, young.

Amongst *Diatoma fenestratum* in a small pool a little below the outlet of Llyn Gwernan near Dolgelley: very rare.

This, which is a very beautiful plant, is much smaller than *Micrasterias rotata*; the segments are deeply divided into five nearly equal lobes which diverge from each other, and are all deeply bipartite; their divisions are linear, bidentate at the apex and also divergent.

The colouring matter is bright green and confined to the centre of the frond; the linear divisions of the lobes being colourless.

I have not seen the young fronds of this species, but their

figure in Ehrenberg shows a difference from the perfect plant so much greater than in *Micrasterias rotata*, that it looks like a distinct species, and is in fact so considered in the 'American Bacillariæ.'

Plate VI. fig. 2. *Micrasterias Melitensis*: perfect frond.

XXXII.—*On the genus* Xiphophora, *and, in connexion with it, Observations on this question: Do we find in the* Fucaceæ *the two Modes of Propagation which we observe in the* Florideæ? By Dr. Montagne*.

Xiphophora, Montgn., nov. gen.

Frons sterilis, ex qua surgit fertilis (seu receptaculum), dichotoma eaque brevior, compressa, flexuosa (en zigzag) apice truncata. Pars maxima frondis in receptaculum planum, elongatum, dichotomum, papulosum, olivaceo-nigrum, apicibus incurvis ensiformibus insigne, abiens. Conceptacula immersa, per totam frondem fertilem sparsa, globosa, poro pertusa, intus nucleum dimorphum foventia; in altero autem observantur sporæ obovatæ, luteo-brunneæ, limbo hyalino cinctæ, e cellulis parietalibus obortæ, paraphysibus gracilibus articulatis simplicibus concomitatæ; in altero vero fila adsunt ramosa, articulata, articulo extremo gemmam oblongam, granulosa repletam materie, tandem liberam et perisporio, ut sporæ genuinæ, vestitam includente. Habitus *Fuci*, at receptaculum *Himanthaliæ*. Nomen e ξίφος, ensis, et φέρω, fero compositum. *Prodr. nov. Phycear. in itin. ad polum antarct.* p. 12. t. 7. f. 1.

Xiphophora Billardierii, Montgn., *l. c.*

Fucus gladiatus, Labill., Pl. Nov. Holl. t. 256.

Obs.—M. Hombron, principal surgeon of the Astrolabe, was the first to find the fructification of this Alga. Previous to this discovery, the plant from its habit had been ranked among the species of the genus *Fucus*, where I would have left it, had it not previously happened that the *Fucus Loreus* was separated on grounds which ought to have the same value in the case of *F. gladiatus*, Labill. In all the known species of *Fucus*, the receptacle, elliptical or lanceolate, terminates the frond or the branches, from which it is altogether distinct. Here we have, as in *Himanthalia*, a frond almost entirely converted into a receptacle; and in order to complete the resemblance, or at least the analogy, instead of a sort of fungiform body from which the receptacle originates, we find a frond very short, dichotomous, and remark-

* From the Annales des Sciences Naturelles for October 1842. Translated and communicated by Dr. Dickie.

ably distinct from the receptacle by its flexuose divisions abruptly truncated toward the summit. But these are not the only differences by which we cannot fail to distinguish the new genus which I propose, either from *Fucus* or *Himanthalia*; there are others more profound and of a higher importance, since they occur in the fructification. Thus, besides the frond being converted into a receptacle, that is to say, charged with conceptacles in the greater part of its extent, these last present two modifications in the organs which they contain. In the one the normal spores spring regularly from the wall of the conceptacle, and are accompanied with filaments which are simple, very slender and jointed, without any dilatation of the terminal articulation, in a word, true paraphyses; in the others we find, instead of these, filaments also articulated but much branched, although limited to the cavity of the conceptacle, and in the terminal articulation of which the inclosed olivaceous granular matter becomes organized into an oblong body which increases in size, and finally separating from the filament, falls into the cavity of the cell like the true spores. We find it then inclosed like these last in a perispore which is furnished to it by the tube of the filament, and its size comes to be equal to the third part of that of the normal spore.

The form and disposition of these organs reminded me of a number of observations which I have already made in analysing the Algæ of this tribe. It appeared to me that it would be interesting to discover in what respect these two kinds of organs differ, and if they are different, to assign to each the functions intended by nature. I have resolved therefore to submit to a new and scrupulous examination all the species of *Fucus*, and all the genera more nearly allied. It is not without much diffidence in my own resources that I have ventured to enter upon a question surrounded with so many difficulties and scarcely alluded to by any botanist; I cannot, accordingly, pretend to have resolved it. I shall be glad if the result of my researches, for which I claim their indulgence, should happen to awaken and fix on this question the attention of physiologists more favourably situated than I am for ascertaining the facts, if it be possible, by observation and direct experiment, and thus obtaining a solution of the great difficulties which it still offers.

All botanists are aware that plants, even those which we call cellular, have two modes of propagation, the one by seeds or spores, the other by buds, gemmæ or propagines. These two kinds of organs, so evident in the *Hepaticæ*, are met with also in the *Florideæ*, a family still more closely approaching that to which *Xiphophora* belongs. It has been completely established by experiments against which no doubts can be raised, that the sphærospores (*anthosperms*, Lamx.), or what we name the second fructi-

fication of the *Florideæ*, can, as well as the seeds of the conceptacular fructification, reproduce an individual similar to the parent plant. Such being the case, what difficulty can there be then in regarding as representatives of one of these two modes of propagation, the kind of gongylæ filled with a granular matter which terminate the branches of the jointed filaments which we meet with in the conceptacles *of all the Fucaceæ*, and which M. de la Pylaie has named *microphytes*, a name which I shall retain until we have finally determined the kind of functions which they fulfill?

I am well aware that no fact, no direct experiment can be produced in proof of this rather rash opinion, but which nevertheless seems to me worthy of examination. Long previous to our having recognised and verified their power of propagating the plant, we had considered the anthosperms of Lamouroux as one of the means of reproduction in the *Florideæ*,—anthosperms, which, under the name of sphærospores or tetraspores, are regarded at present as the normal fructification, whilst the conceptacular has fallen to the second rank, and is only considered by some phycologists as an anormal and succedaneous mode of propagation. However this may be, either I am much mistaken, or it appears to me that we may recognise these two modes of reproduction in the *Fucaceæ*, first, in the true spores, either fixed to the base of the paraphyses or to the wall of the conceptacle itself; second, in the microphytes of M. de la Pylaie, figured by Lyngbye (Hydroph. Dan. t. 1. B. figs. 3 and 4). These microphytes are most assuredly similar or at least analogous to many of the conceptacular fructifications which among the *Florideæ* are produced in the terminal articulation of a branched and jointed filament, which is usually, as in this case, a continuation of those which constitute the frond. Does not this resemblance between analogous organs in two neighbouring and parallel series appear to add some weight to the opinion held by M. Decaisne respecting the secondary importance of the conceptacular fructification? I confess that, previous to having these new ideas respecting their nature, I took for young spores the gongylæ which the microphytes bear. The error was so much more difficult to avoid, since many species appear destitute of true spores. In his general remarks on the *Fucaceæ*, M. Meneghini (Alghe Ital. e Dalmat.) himself appears to have considered as normal spores the gemmæ which are borne by the branched filaments of the microphytes; in fact, he expresses himself as follows:—"Essi asci sono ramosi-articulati, alcuni sono fertili, portano cioè le spore, ciascuna delle quali è solitaria in uno degli articoli terminali, gli altri," &c.

We now proceed to the observations, which to a certain extent support my ideas respecting the organs in question:

In one species of *Marginaria*, the *M. Urvilliana*, I have found true spores, accompanied by paraphyses almost simple, jointed, and not inflated at the extremity; the other, *M. Boryana*, in more than twenty receptacles thoroughly examined, has only presented microphytes, very much branched, jointed, and having the terminal articulation of the branches dilated into a spore or gemma, if we prefer this last name, which, becoming detached from the filament, falls into the middle of the conceptacle enveloped by the membrane of the tube in the form of a perispore.

In the *Scytothalia Jacquinotii* I have seen normal spores, accompanied by paraphyses almost simple, moniliform, and transparent.

It would appear from my researches, which unfortunately I have not been able to follow out in a sufficient number of individuals, that in *Himanthalia* the two sorts of filaments, in place of occurring on the same receptacle and in different conceptacles, as in the genus *Xiphophora*, are met with on different individuals. On four specimens analysed by me, two had the normal fructification, which we call *basispermal*; the others only presented microphytes, to which we may also apply the name *acrosperms*, to distinguish them from the first, although I freely confess that there exist intermediate forms which will render these denominations somewhat vague. I state what I have seen in the examples of *Himanthalia* in my possession, but I am far from affirming that such is always the case. I would very much recommend the verification of this point to such botanists as may have opportunity of doing so.

The *Fucus vesiculosus*, of which I have only examined three individuals, has invariably shown the basispermal fructification.

In *F. ceranoides* these are absent, or at least I have only seen one sort of filaments; these are microphytes.

Lyngbye figures the two kinds of filaments and of fructification in *F. serratus*; now on more than ten individuals which I have examined (it must be acknowledged in a dried state) I have only met with the microphytes of the preceding species, differing from them only a little in shape.

As certain *Florideæ* present the two modes of propagation united on the same stem but not confounded together, we also find in *Fucus canaliculatus*, inclosed in the same conceptacle, the filaments of the two kinds, that is to say, the basi- and acrospermal fructification.

It is nearly the same with *F. distichus*; in it we observe all the transitions from true spores to what we may consider as gemmæ or propagines.

Lastly, in a great number of examples of *F. nodosus*, L. (*Halidrys nodosa*, Lyngb.), I have only observed microphytes; and what

is very remarkable, M. de la Pylaie, who has analysed on the spot at Terre Neuve a great number of individuals of this same species, has never, more than myself, met with the other form of fructification. Nevertheless, Lyngbye has represented the basispermal fructification of this species, and Turner (Hist. Fu . t. 98) says even positively that in it he has seen the two sorts of filaments in the same conceptacle, and what is more, he represents them in such a way that one cannot fail to recognise them.

Such are the facts on which I found my opinion respecting the two modes of propagation in the *Fucaceæ*. I shall not conceal their insufficiency, for I freely acknowledge that they want the sanction of experience. Nevertheless, the subject appears to me to merit the attention of naturalists at a time when the Algæ have been made the subjects of so many important researches.

Some time ago M. M. Crouan (An. Sc. Nat. xii. p. 250) had spoken of the double fructification of *Himanthalia*, and more recently M. J. Agardh (Alg. Medit. et Adriat. p. 45) has agitated this same question, which had occupied my attention long ago, by expressing it under the form of a doubt. For example, he says, "Alter fructificationis forma in filis receptaculorum forsan adest, licet hoc experimentis directis nondum probatum fuerit." The opinion of the celebrated Swedish phycologist, although stated with such reserve, appears to me to give some value to that which I have been attempting to sustain in this short notice. Whatever judgement may be passed on this, I shall persist in believing that there is in this matter something more than has been hitherto recognised, and that it is a subject of research which interests in a high degree the science of Algology.

XXXIII.—*Further Observations on* Ctenodus Labillardieri. By C. Montagne, D.M., *in a Letter to the* Rev. M. J. Berkeley, M.A., F.L.S.

My dear Friend,

You doubtless recollect that some time since you communicated to one of your Botanical Journals some observations which I had addressed to you in the course of our correspondence upon the fructification of the new genus *Ctenodus*. You will recollect too that I begged you to procure for me if possible a single fruit of the specimen figured in the excellent work of Turner; for I could not persuade myself that so excellent an observer could have seen but one cell where I had seen twenty. It appeared then more than probable that the singular fructification which I have published, and which had also been observed by Mr. Harvey, was not the conceptacular form figured in the 'Historia Fucorum.' A recent com-

munication from Mr. Harvey has proved the truth of my suspicion; and I take the earliest opportunity of informing you of it, that you may be so kind as to complete the communication relative to the very curious fructification of *Fucus Labillardieri* which you made on a former occasion. This fructification has the same external appearance as the other, and it is only on analysis that we find, that instead of a considerable number of cells it has but one, which opens by a pore at the summit. Among the admirable figures in Kützing's work, I do not find one capable of giving you an idea of it, or I should be content with merely citing it. I am going then to describe it as briefly as I can. From a central axillary placenta a tuft of branched articulated filaments arises in the form of a wheat-sheaf, whose coloured endochromes are rather longer than broad. Their tint is faint below, but as they approach the summit of the tuft, the colour becomes brighter and more purple. These are the last joints of the filaments in question, whose endochromes become the spores. They are in form oblong, resembling somewhat that of grape-stones. Measured by the micrometer their length is from one to two centièmes of a millimetre, and their breadth from the two-hundredth to the hundredth of a millimetre. They are of a beautiful purple and extremely numerous. As they are formed at the summit of the filaments and occupy the upper part of the cavity, we have the explanation of the imperfect figure of Turner, incomplete I mean in this sense, that the structure of his microscope did not allow him to see the rest of the fructifying apparatus. You see then that this fructification does not differ from that which we find in many other *Florideæ*, and that without its remarkable tetrasporic fruit it would not form a distinct genus. You will moreover observe that I was not deceived in my anticipations, since chance has procured me the knowledge of the other mode of reproduction, of whose existence I felt sure from analogy. I received a day or two since a letter from M. Zanardini, a well-known phycologist of Venice, in answer to my communication relative to *Ctenodus*: you will see by the terms of his letter which I am going to translate, that the specimen which he possesses of *Fucus Labillardieri* has the conceptacular fruit. "I have examined attentively," he says, "your recent labours on the genus *Ctenodus*. M. Diesing has given me a magnificent specimen of this Alga. I have subjected to a scrupulous examination many capsules, and I have felt vexed at not being able to observe the facts which your figures represent, either as regards the plurality of cells, or the centripetal direction of the organs of fructification." It is clear, since he could not observe them, that M. Zanardini had before him, not the form figured by me, but the conceptacular form illustrated by Turner.

I do not like to let this opportunity escape of apprising you of

another conceptacular fructification not less remarkable, and which must be very rare, since no one has hitherto described it. It is however that of one of our commonest Algæ; I mean *Gelidium corneum*. I think I showed you the analysis I had made on your late visit to Paris. In many dozens of individuals from different localities which exist in my herbarium, one only had conceptacular fruit; all the rest were either barren or had tetraspores. In his 'Algæ Mediterranei Maris,' M. J. Agardh excuses himself for not describing it; because, he says, he has not got it at hand. This fructification however deserves to be known, and I am going to endeavour to give you an idea of it, which I am sorry that I cannot accompany with a figure to make you understand it more easily.

The conceptacles of *Gelidium corneum*, which may be considered as the type of the genus, are developed in the ultimate pinnules which they terminate, so that the base of the pinnule forms a sort of peduncle, and the tip a mucro, which however is sometimes wanting. If by two parallel incisions made in the direction of the axis, one obtains a very thin slice of the centre of the conceptacle, and after carefully separating it from the lateral portions it is placed on the two plates of glass in Schiek's compressor, it appears under the microscope that the centre is traversed by a sort of columella. This, formed by the termination of the filaments which occupy the centre of the fronds and of the branches, in a word by the medullary tissue, presents in this respect a sort of analogy with the organ of the same name in the capsule of mosses. From all points of its circumference there proceed numerous short branches which bear at their tips a little group of cells of the most delicate tissue, and of such extreme transparence that one can see them only by varying the intensity of light by means of the diaphragms of the instrument. The cells in question, at first almost spherical (at least there are some of this form mixed with the rest), become gradually oblongo-claviform as they increase. It is in their cavity that the spores are developed, but there are a great number which remain barren and consequently transparent. The spores, which are pyriform and of a deep purple, are innumerable, and placed horizontally round the central columella, from whence they radiate towards the walls of the cell, and to which they remain for a long while fixed by their more slender extremity. This disposition calls to mind the unilocular capsule of some *Caryophylleæ*, traversed by a central placenta. I am only speaking as regards form. As the conceptacle has no natural aperture, at least in the individual before me, it appears probable that the spores are not dispersed till the decay of the plant.

I forgot to tell you, in order to complete my observations on

Ctenodus, that in a letter lately received, Mr. Harvey tells me that at an advanced stage of growth, the receptacles of the individuals with tetrasporic fruit present a pore corresponding with each cell, by which the spores escape.

XXXIV.—*Description of a Fossil Molar Tooth of a* Mastodon *discovered by* Count Strzlecki *in Australia.* By Prof. Owen, F.R.S.

The large fossil femur, transmitted to England in 1842 by Lieut.-Col. Sir T. L. Mitchell, Surveyor-General of Australia, from the alluvial or tertiary deposits of Darling Downs, and described in the 'Annals of Natural History' for January 1843, p. 8. fig. 1, gave the first indication of the former existence of a large Mastodontoid quadruped in Australia.

The portion of tooth described and figured in the same communication (p. 9. figs. 2 and 3), presenting characters very like those of the molars of both the *Mastodon giganteus* as well as of the *Dinotherium*, and being from the same stratum and locality as the femur with which it was transmitted, was regarded by me as having most probably belonged to the same animal; and, on the authority of drawings subsequently received from Sir T. Mitchell, was referred to the genus *Dinotherium**.

Having since received specimens of portions of lower jaws with teeth identical in structure with the fragment figured in my first communication to the 'Annals' (p. 9. figs. 2 and 3), I find that the reference of that portion of tooth to the genus *Dinotherium* was premature and erroneous. The extinct species to which it belonged does, indeed, combine molar teeth like those of the *Dinotherium* with two large incisive tusks in the lower jaw, but these tusks incline upwards instead of bending downwards, and are identical in form and structure with the tusk from one of the bone-caves of Wellington Valley, described by me in Sir T. Mitchell's 'Expeditions into the Interior of Australia,' vol. ii. 1838, p. 362. pl. 31. figs. 1 and 2, as indicative of a new genus and species of gigantic marsupial animal†, to which I gave the name of *Diprotodon australis*.

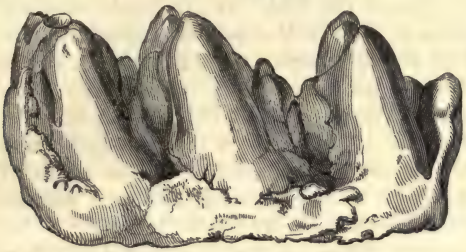
It is not my present object to describe these most interesting additional fossils of the *Diprotodon*, or to enter into the question whether the great femur before alluded to belonged, like the fragment of tooth transmitted with it, to the *Diprotodon*, or to a

* Annals of Natural History, May 1843, p. 329. fig. 1.

† See also my paper "On the Classification of Marsupialia," Zool. Trans. vol. ii. p. 332, in which the *Diprotodon* is placed with the Wombat in the family '*Phascolomyidæ*.'

different and larger animal; but briefly to make known the more decisive evidence of the former existence of a large Mastodontoid quadruped in Australia, which is afforded by the tooth figured, on the scale of half an inch to one inch, in the subjoined cuts.

Fig. 1.

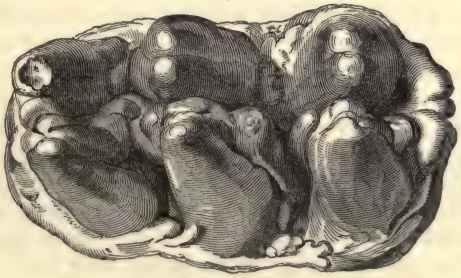


Mastodon australis, half nat. size.

If these figures be compared with those of the molar teeth of the *Mastodon angustidens*, reduced to the same scale, in Cuvier's 'Ossemens Fossiles,' 4to, vol. i., 'Divers Mastodontes,' pl. 2. fig. 11, pl. 3. fig. 2, or with that of the more abraded molar, pl. 1. fig. 4, they will be seen to present a generic and almost specific identity.

The close approximation of the Australian Mastodon to the *Mast. angustidens* will be appreciated by a comparison of fig. 1 with a similar direct side-view of an equally incompletely-formed molar given by Cuvier, *loc. cit.* pl. 1. fig. 1; but this tooth, being from a more posterior part of the jaw, has an additional pair of pyramidal eminences; and if the proportions of the figure of half an inch to an inch be accurate, the European tooth is rather

Fig. 2.



Mastodon australis, half nat. size.

smaller than the Australian fossil, notwithstanding its additional tubercles and more backward position in the jaw.

The Australian fossil tooth here described was brought by a native to Count Strzlecki, whilst that enterprising and accomplished traveller was exploring the ossiferous caves in Wellington

Valley. The native stated that the fossil was taken out of a cave further in the interior than those of Wellington Valley, and which Count Strzlecki was deterred from exploring by the hostility of the tribe then in possession of the district. With this circumstantial account, communicated to me by Count Strzlecki when he obligingly placed the fossil in my hands, and with the previous indication of a large Mastodontoid quadruped in the femur transmitted by Sir T. Mitchell from Darling Downs, there seems no ground for scepticism as to the veritable Australian origin of the molar tooth in question, notwithstanding its close similarity with the *Mastodon angustidens* of the European tertiary strata. It is partially mineralized and coated by the reddish ferruginous earth characteristic of the Australian fossils discovered in the Wellington ossiferous caves by Sir T. Mitchell.

The amount of difference between the Australian molar and those of the European *Mastodon angustidens*, though small, equals that by which the molars of the *Mastodon Andium* are distinguished from the molars of the *Mastodon angustidens*; and if species so nearly allied have left their remains in countries so remote as France and Peru, still more if the *Mastodon angustidens* or *longirostris* formerly existed, as has been affirmed, in North America, we need feel the less surprise at the discovery of a nearly allied species in the continent of Australia.

The fossil in question is the crown of an incompletely formed molar, with the summits of its mastoid or udder-shaped eminences entire, its fangs undeveloped, and its base widely excavated by the unclosed pulp-cavity. It supports six principal mastoid eminences in three transverse pairs, with a narrow ridge at the anterior part of the base of the crown, and a small quadrituberculate talon or basal prominence posteriorly: the three transverse eminences are joined together by a pair of small tubercles at the basal half of each interspace, placed in the long axis of the crown, and rather to the outer side of the middle line of the grinding surface, fig. 2.

The length or antero-posterior diameter of the crown is four inches ten lines: the breadth of the posterior pair of tubercles is two inches eleven lines: the height of the middle eminences from the base of the crown is two inches six lines: the tooth is apparently the fourth molar of the left side of the lower jaw. In comparison with a corresponding molar in the same state of growth of the *Mastodon longirostris** of Kaup, a cast of which is now before me, the Australian molar differs in having the principal transverse eminences more compressed antero-posteriorly in pro-

* If this species be distinct from the *Mast. angustidens* of Cuvier, the molar teeth seem to me to offer precisely the same characters.

portion to their height, and tapering to sharper summits, which however are obtuse and bifid. The breadth of the tooth slightly increases to the posterior pair of eminences, whilst in the *Mastodon longirostris* and *angustidens* the crown maintains the same breadth, or more commonly becomes narrower from the anterior to the posterior pair of mastoid eminences.

Other differences observable on a minute comparison are too trivial to deserve notice, especially when observed in only a single example of a complex molar tooth. In the Australian specimen under consideration the mastodontal characters are unmistakeable, and the resemblance to the molar teeth of the *Mastodon angustidens* is very close. The specific distinction of the Australian Mastodon rests, at present, only on the slight differences pointed out in the form of the mastoid eminences and the contour of the crown of the molar tooth.

The question may arise, whether identity of generic characters in the molar teeth of an extinct Australian mammal with those of the *Mastodon* can support the inference that the remaining organization of the Proboscidian Pachyderm coexisted with such a form of tooth? The analogy of the close mutual similarity which exists in the molar teeth of the Tapir, Dinothere, Manatee and Kangaroo suggests the surmise that the mastodontal type of molar teeth might also have been repeated in a gigantic Marsupial genus which has now become extinct; and such an idea naturally arose in my mind after having received evidence of the marsupial character of the *Diprotodon* and *Nototherium* *, two extinct Australian genera, with the tapiroid type of molars, represented by species as large as a Rhinoceros.

The more complex character of the molars of the *Mastodon*, and the restriction of that character, so far as is now known, to that genus only, makes it much more probable, however, that the molar here described belonged to a true *Mastodon*, and the species may be provisionally termed *Mastodon australis*.

London, August 22, 1844.

XXXV.—*An Attempt to Classify the* Tetrabranchiate Cephalopods. By William King, Curator of the Museum of the Natural History Society of Northumberland, Durham, and Newcastle-upon-Tyne.

The following observations on the Tetrabranchiate Cephalopods are in substance the same as some which formed part of two lectures which I delivered in the autumn of 1841 in the Theatre of the Literary and Philosophical Society of Newcastle-upon-Tyne.

* The characters of these genera and the evidences of their marsupial nature will be the subject of a future communication.

It will be seen that these shells are classified not only according to their agreement with each other in general character, but also in accordance with their relative order of creation. The synopsis at the end will make this mode of classification intelligible at one view.

In a paper which I read at a meeting of the Natural History Society of Northumberland, &c. in March 1843, on the family *Unionidæ*, the following view was advanced:—"I would again urge attention to the two elements which are necessary to be attended to in classifying any section of the animal kingdom, namely, *agreement of structural character* and *relative order of creation*. If all animated forms had been produced at the same time, and there had been no previous dying out of these forms, the plan that is generally adopted in arranging a zoological group, that is, by attending to structural resemblances alone, would be perfectly admissible; but as innumerable species (for the most part extinct) have succeeded each other during former periods of the world's history, it follows, that to introduce such species in a natural classification, without any reference to their order of creation, would be equivalent to constructing a genealogical chart without attending to the relative period of the different families." Entertaining this view, it may be readily conceived that I read with considerable interest the Chevalier Agassiz's observations, which have recently appeared, on the classification of Fishes, and especially the following remark:—"It will not be sufficient henceforwards to group genera and species according to their organic affinities; we must also take into account the relative age of their appearance on the surface of the globe, and the importance of each group in the different epochs of the general development; in a word, zoology ought to comprehend in its systems the genealogy of the whole animal kingdom*."

The Cephalopods have been divided into two sections, depending on their having two or four gills; those with two gills are termed Dibranchians, and such as have four are called Tetrabranchians. This is Prof. Owen's arrangement and nomenclature. The Calamary, Cuttle-fish, Argonaut, and Spirula are examples of the dibranchiate, and the Pearly Nautilus represents the tetrabranchiate section.

The Dibranchians are extremely common at present; as yet, we have no evidence that they lived during any portion of the primary period; but from the abundance of their remains in the corresponding rocks, it is certain that the secondary seas sustained them in incredible numbers. The Tetrabranchians appear

* Vide a translation of this paper in the last number (73) of the 'New Edinburgh Philosophical Journal.'

to have existed at an early period of organic time; and the occurring of their testaceous coverings in every subsequent deposit, together with their still inhabiting the Southern Ocean, prove that they have survived to the present day.

If we examine a specimen of the Pearly Nautilus which has been longitudinally divided, its inner part will be seen to consist of a number of cells or chambers, the partitions or dividing plates of which have a small tubular perforation in the centre. The animal or mollusk which inhabits this shell is, allowing for some important differences, allied to that which tenants an ordinary univalve: it occupies the outermost chamber; but a portion of its enveloping tegument or mantle, in the shape of a slender membranous tube or siphon, accompanied with a vein and an artery, passes through the whole of the chambers by means of the tubular perforations*. This tube may be one means of keeping the animal fixed in its place; but the principal seem to be two muscles, one on each side of the body, which are connected with the lateral walls of the chamber.

It is generally supposed that the chambers constitute "an apparatus which renders the Nautilus nearly of the same specific gravity as the surrounding water, and enables it to rise to the surface of the sea, or sink to the bottom, simply by altering the extent of the surface exposed to the water by its soft parts†."

Now the Ammonite or snake-stone, as it is popularly called, is a shell which is constructed on the same general plan as the Pearly Nautilus, and which it is generally admitted was fabricated by a cephalopodous mollusk‡. Specimens of the Ammonite are quite common which show distinctly their inner part divided in the same manner as the Nautilus, but in each of these genera the siphonal sheath is differently placed, and the plates have a different form. In the Ammonite the siphonal sheath is in contact with the outer or dorsal part of the shell, whereas it is central or nearly so in the Nautilus: and the edge of the plates, instead of being plain and slightly sinuous, as in the last genus, alter-

* The siphon appears to have been strongly protected in some fossil Nautiluses both by an elongation of the tubular perforation and by additional calcareous tubes (*N. sipho* and *N. striatus*, Buckland in 'Bridgewater Treatise'). These parts, whether only one or both are known to occur in a fossil, will be considered in the light of a *siphonal sheath*, and as such will be termed in the following pages.

† In my lecture, as it was originally delivered, Dr. Buckland's hypothesis respecting the use of the siphon was examined. This hypothesis having been shown to be untenable by the researches of Prof. Owen (vide Hunterian Lectures on the Invertebrate Animals), I have thought it necessary to cancel my original remarks, and to replace them by the above extract from Dr. Mantell's highly interesting 'Medals of Creation.'

‡ The Ammonites, and all the other shells mentioned in this paper, are placed in the tetrabranchiate division of the Cephalopods, in accordance with the views of Prof. Owen.

nately curves before and behind a line corresponding to the plane of the centre of the plates, so that allowing this line to pass through a series of curves, the edge may be said to be divided into an anterior and a posterior set of lobes, which are either simple or compound, according to species; further, these lobes, throughout their whole contour, are set off with numerous pointed digitations, which are invariably directed backwards, that is, towards the origin of the whorls. These digitations, Dr. Buckland observes, may have served as holdfasts, by which the posterior part of the animal's mantle could fix itself firmly, and as it were take root around the bottom of the outer chamber.

The remains of both these divisions of the Tetrabranchians are common to certain of the secondary rocks. In the Silurian portion of the primary period a great many of the then existing cephalopodous shells possessed plain-edge plates, and thus they agreed so far with the Nautilus; but strictly speaking, their siphonal sheath cannot be said to be central, since it is often situated within and at a distance more or less from either the outer or the inner margin of the plates.

These early cephalopodous shells arrest our attention by the variety of shapes which they have assumed. They may be said to run into every conceivable form from a close coil to a straight line. The straight ones have received the name of *Orthocerus*; those which are curved are called *Cyrthocerus*; and such as are tendril-shaped or open-coiled have been termed *Gyrocerus*: these last appear to be closely allied to some whose coils are in contact with each other, and for which may be used the provisional name *Discus* *: again, these conduct us to a shell which is close-coiled when young, but afterwards it strikes off at a tangent: this is Montfort's genus *Lituites*. Besides these, several other kinds have been described and otherwise named.

It has been observed, that in a great many of the Silurian Cephalopods the siphonal sheath oscillated as it were between the outer and the inner edge of the plates without touching either. Along with these there existed others somewhat different, inasmuch as the edge of their plates is more or less sinuous, and their siphonal sheath is placed in some on the outer, and in others on the inner margin of the plates: these constitute the genera *Goniatites* and *Clymenia*.

Now it is a remarkable fact, that in whichever genus of the tetrabranchiate Cephalopods we find the edge of the plates undulated, we in general observe the siphonal sheath approximating

* Sowerby, in the 'Mineral Conchology,' has applied Montfort's name *Ellipsolithes* to these shells (compare generically *E. funatus*, tab. 32, with *Nautilus undosus* of the 'Silurian System'), which cannot be allowed, since Montfort's genus was founded on a species of *Ammonites* from the Chalk near Rouen.

to the dorsal or to the ventral aspect of the shell. Hence we have no difficulty in graduating the Discus with its simple plates and oscillating siphonal sheath, either into the Goniatite or the Clymenia.

From the close-coiled *Discus* to the straight *Orthocerus*, our passage is with as little difficulty effected through the genera *Gyrocerus* and *Cyrthocerus*.

Thus the Silurian period has furnished us with various cephalopodous forms, which, notwithstanding their dissimilarity, may be linked together in perfect harmony. We shall now endeavour to connect them with some of the same class which have since sustained their part throughout the various organic revolutions of our globe.

In passing from the Silurian to the Carboniferous period, most of the forms which have been mentioned accompany us; they deviate however more and more from their original types as we leave in the distance our starting-point: thus most of the Carboniferous Goniatites differ from the simple-lobed species of the Silurian rocks in having the edge of their plates more complicated; and several of the Carboniferous Nautiluses are distinguishable from their Silurian prototypes, the Discuses, by their possessing the true conventional characters of the genus in which they have been placed.

The Cephalopods with a ventral siphon, as the beautiful Clymenias, do not appear to have undergone any amount of change; nor do they seem to have long survived the epoch of their creation. It is otherwise, however, with those which were furnished with a dorsal siphon: they made their first appearance during the Silurian epoch; thence we are able to trace them through the whole series of stratified deposits to the Cretaceous* æra,—thus continuing throughout two immense geological periods, the primary and secondary. During this range, the edge of their plates underwent a variety of modifications: in the first instance, the plates had simple lobes, such as are displayed in the Silurian Goniatites; the crown of the dorsal and lateral posterior lobes, however, became divided or digitated in the Carboniferous species†; afterwards, for example, in the Triassic period, the divisions

* The palæontologist, who is of opinion that we are *now acquainted with the fossils of every geological period*, may be disposed to question this assertion, and to dwell upon the absence of these shells in the Permian rocks.

† The simple dorsal lobe of the early *Goniatites* is divided in most of the Carboniferous species, according to Vicomte d'Archiac and M. de Verneuil: the posterior lateral lobes which verge on the dorsal aspect of the shell are divided in *G. mixolobus*, *G. cyclobus* and *G. Looneyi*; and in a species (———) from the western side of the Oural Mountains, specimens of which are in the Russian collection of the Newcastle Museum, the crown of all the lateral lobes is divided.

became decidedly more numerous, and even the sides of the posterior lobes which verge on the dorsal aspect of the shell assumed this character, as may be observed in the Ceratite*; and subsequently, that is, throughout the Jurassic and Cretaceous epochs, the whole contour of the posterior, and also of the anterior lobes, became digitated, which is shown in the beautiful foliations of the Ammonite.

It has been previously remarked that the plain-edge-plate Cephalopods or Nautilidians† of the primary period ran into a variety of shapes, from a close coil to a straight line,—a disposition which we never find displayed in the early Ammonidians‡, as the Goniatites, nor in their successors, the Ceratites: but no sooner do the Ammonites appear than they imitate the forms of their remote predecessors: thus a certain section of the last disunites its coils and becomes the gyroceroid Criocerus §; this before long completely unfolds itself, and thus we have the cyrthoceroid Ammonocerus ||, whose light and graceful arch is afterwards unbent to form the fragile orthoceroid Baculite. But our list of changes still remains unexhausted: another section of the Ammonites retains the normal form for a certain time; then strikes off its coil at a tangent to be afterwards curved back, and hence we have the Scaphite; and the Criocerus, as if conscious that it could improve this figure, assumes the more pleasing yet singular form of the Ancylocerus.

But these forms are merely modifications of the shell unfolding its coils on one and the same plane. Unlike the primary shells in this respect, certain of the Ammonidians are obliquely coiled or spiral, and the coils strike off from the slight deviation exhibited in the Jurassic *Turrilites Boblayei* to the extreme which is observable in the Cretaceous *T. costatus*.

The Turrilite is essentially an Ammonite having a spiral convolution, inasmuch as the coils, in both kinds, are in contact; but the last is not the only form that passes into a spirally coiled Cephalopod, since we find the evolute Criocerus *obliquating* its coils to become the Heliocerus.

* In none of the figures that I have seen of the Ceratite is the character particularized in the text represented: it is displayed in a specimen belonging to the Newcastle Museum.

† Family *Nautilidæ*. ‡ Family *Ammonidæ*.

§ According to Mr. Morris (Catalogue of British Fossils) a species of *Criocerus* is found in the Kelloways rock, Wiltshire.

‖ Lamarck's genus *Ammonocerus* is evidently the same as D'Orbigny's *Toxocerus*, which is of a later date. D'Orbigny states that it is found in the Jurassic system, but does not mention in which division. I found it in the Jurakalk near Streitberg, Franconia, in 1839. *Criocerus* must be found in an earlier, or at least an equivalent rock, before what is said in the text of *Ammonocerus* can be received, even as a sound metaphor.

The development of so many genera of the foliate-plate cephalopodous shells at a time when they were about to disappear, would almost induce the notion that every form that could be assumed had been tried to perpetuate them: but a grand organic change was to arrest their evolutions: that change was to annihilate them:—and thus the eve of the secondary epoch, which had seen them luxuriating under every form, was destined to be a witness to the final struggles of the Ammonidians!

Let us now turn our attention to the Nautilidians. It will be recollected that we left them revelling in the Carboniferous epoch under the forms of *Orthocerus*, *Cyrthocerus*, *Discus* and *Nautilus*. With one exception, and at the close of this period, these forms became suddenly extinct, and even the excepted genus—the last, appears to have with difficulty escaped the fate of its congeners, since the deposits which were formed during the succeeding ages, the Permian and the Triassic, yield us but few species. Afterwards the Nautilus seems to have completely recovered from the check which it had previously sustained, as the Jurassic and the Cretaceous rocks teem with new specific forms. This state however did not continue, for the same devastating influences which overtook the Ammonidians encompassed the Nautiluses: the first were destroyed and the last survived; but only to live in reduced numbers during the Tertiary epoch, and to be reduced still more in our own.

Like the Ammonidians of the Jurassic and the Cretaceous period, some of the contemporaneous Nautiluses appear under characters somewhat different from those of their predecessors: for example, the slightly sinuous edge which in general marks the plates of this genus is lobed in such species as *Nautilus sinuatus* and *N. biangulatus*; the same character appears to have been preserved in *Nautilus Danicus*, and it would seem to have arrived at its maximum in the Tertiary *Nautilus sipho* and *N. ziczac*.

We have now traced the Tetrabranchiate Cephalopods throughout their entire existence. We have observed them in one period abounding to excess, and in the next to become considerably reduced; then again to burst forth in countless numbers, and afterwards to become all but extinct.

Shall we conclude that the existence of but two species in the present seas indicates an approximating termination to their career? A knowledge of their past history ought to make us pause before we adopt this conclusion, for what have we to oppose their re-entering another Jurassic period?—their again appearing in a thousand forms?—in short, what have we to disprove, that they are still destined to sustain an important part in the future zoological revolutions of our globe?

The principal genera of the Tetrabranchiate Cephalopods classified according to their agreement in general character and chronological appearance.

Primary Period.				Secondary Period.			Tertiary Period.	Quaternary Period.
Silurian Epoch.	Devonian Epoch.	Carboniferous Epoch.	Permian Epoch.	Triassic Epoch.	Jurassic Epoch.	Cretaceous Epoch.		
Orthocerus.	Orthocerus.	Orthocerus.	Orthocerus?	Orthocerus?	Orthocerus?			
Cyrthocerus.	Cyrthocerus.	Cyrthocerus.						
Gyrocerus.	Gyrocerus. Clymenia.	Clymenia?						
Discus.	Discus.	Discus.						
Lituites.								
		Nautilus.	Nautilus.	Nautilus.	Nautilus.	Nautilus.	Nautilus.	Nautilus.
Simple Goniatites.	Simple Goniatites.	Simple Goniatites.			Lobed Nautilus.	Lobed Nautilus.	Lobed Nautilus.	
		Digitated Goniatites.	Digitated Goniatites?	Digitated Goniatites?	Digitated Goniatites?			
					Ancylocerus.	Ancylocerus. Baculites.		
					Ammonocerus	Ammonocerus.		
					Criocerus.	Criocerus.		
				Ceratites.	Ceratites?			
					Ammonites.	Ammonites.		
						Scaphites.		
					Turrilites.	Turrilites.		
					Heliocerus.	Heliocerus.		

Notes connected with the Synoptical Table.

I have drawn up the foregoing Table without having seen that which accompanies Agassiz's paper: the translation in Professor Jamieson's Journal is all that I have seen at present.

It must be understood, that I offer this classification of the Tetrabranchiate Cephalopods only as an approximate one. It is for the principles of such a classification that I contend. The genera *Orthocerus*, *Ceratites* and *Goniatites* have been carried up into the Jurassic epoch, because they have been found in the St. Cassian (Tyrol) beds, associated with Ammonites and other fossils of this age.

If the Ceratites are of the epoch mentioned in the last note, and the Ammonites did not exist previously, it follows that the latter must be connected with the former, as represented in the Table.

I confess that I have little faith respecting the Ammonites having died out at the close of the secondary period. In the case of many species and genera we find, that although they have ceased to exist in our own seas, they are still to be found living in other latitudes: this fact leads me to think, that the Ammonites may have lived within the tropics during the deposition of the early tertiary beds of France and England. In making this remark, I have in view the Ammonidians of Pondicherry and other places in India.

The generic difference between the Russian *Goniatites* ——? and *Ceratites nodosus* is so trifling, as to cause me to think that the last genus will yet be found as low down as the Permian or the Carboniferous series. Fossils undoubtedly form a good character by which to enable the geologist to decide as to the age of a rock; but it ought always to be borne in mind, that unless the relative position of such a rock to others whose general character is known can be fairly made out, the organic test should be received with due caution.

I have placed the Scaphites in connexion with the Cretaceous Ammonites; it is probable however that they existed previously to the latter. There is a Jurassic species of *Ammonites* (I do not know the specific name at present) which becomes contracted and irregular as it advances in age; perhaps it stands in the same relation to the true Scaphites as the Jurassic *Turrilites Valdani* does to the true Turrilites of the Chalk.

The Table will show that I differ from D'Archiac and De Verneuil as regards *Nautilus sipho* and *N. ziczac* being Clymenias (Trans. Geol. Soc. vol. vi. p. 328); and from Buckland and others respecting these lobed species forming the link between the Ammonites and the Nautiluses. The way in which I have spoken of the Discuses in the lecture would imply that I consider them to form the original type of the Tetrabranchiate Cephalopods: it seems preferable to wait until we know more of the early fauna of our planet before any positive opinion is hazarded on this point.

XXXVI.—*Generic characters of an undescribed Australian Fish.*

By John Richardson, M.D., F.R.S. &c., Medical Inspector of Naval Hospitals.

Forma compressissima, circumscriptione laterali semiparabolica: facie frontata oblique retro descendenti.

Os parvum, rictu fere horizontali, parum declivi. Maxilla inferior porosa, cirris minimis parce prædita.

Dentes minutissimi (microscopici), arenacei in maxillis utrisque, ossibusque pharyngeis stipati. Lingua, vomer, palatumque læves.

Oculi laterales in summa gena positi.

Ossa capitis operculorumque inermia, sulcatim insculpta.

Os preorbitale membro tenui verticali, disco infero dilatato insculpto. Catenula suborbitalis membranaceo-tubulata, nec ossea, oculo remota, e disco preorbitalis ad tempora, genam transcurrens.

Apertura branchialis ampla, postice infraque etiam intra ramos maxillæ inferioris, ad mentum usque, extensa; super operculum clausa. *Membrana branchiostega* superne apiculata, infra nec isthmo annexa nec cum pari suo conjugata; radiis sex sustenta.

Squamæ nullæ. Cutis lævissimus. *Linea lateralis* postice summum dorsum attingens. *Anus* medianus, papilla nulla.

Pinnæ pectorales satis magnæ, pauciradiatæ, humiles, positione, forsitanque functione ventrales pinnas quæ desunt simulantes; radiis tenuibus, indivisis, articulatis.

Pinna dorsi pinnam *Agriopi* referens, per totum dorsum ab extremo fronte ante oculos ad pinnam caudæ usque, cui membrana connexa, regnans; radiis ejus et pinnis ani articulatis, attenuatis vix a radiis non articularibus, oculo nudo dignoscendis.

Pinna ani a pinna caudæ discreta. Radii pinnæ caudæ indivisi, tenues, articulati.

Obs.—Anatomia ignota. Vertebræ circiter 35, quarum 18 ad caudam pertinentes. Nescio an inter Gobiidas an cum Blenniidis recensendus sit *Patæcus* *. In forma corporis pinnæque dorsi, necnon in sculpturis ossium capitis analogiam *Agriopo* exhibet ut affinis ejus *Chœnicthys*. *Triglam* simulat.

Patæcus fronto, species unica adhuc detecta.

Rad.—Br. 6; D. 24|16; A. 11|5; C. ; P. 8.

Icon. Zoology of the Voyage of the Erebus and Terror, plate —?

Hab. Southern Australia. A specimen presented to the British Museum by Governor Gray.

* Th. παταικοί, simulacra deorum Phœnicum in puppibus.

BIBLIOGRAPHICAL NOTICES.

Plantæ Javanicæ Rariores, descriptæ iconibusque illustratæ, quas in Insula Java, annis 1802—1818, *legit et investigavit* Thomas Horsfield, M.D., *e siccis descriptiones et characteres plurimarum elaboravit* Joannes J. Bennett; *observationes structuram et affinitates præsertim respicientes passim adjecit* Robertus Brown. Londini, apud H. Allen et socios. Part 2 and 3.

We must refer (vol. ii. pp. 214, 294) to our notice of the first number of this important work for some observations elicited from us by our high respect for Dr. Horsfield, and by our sense of gratitude to the Board of Directors of the East India Company for the liberal spirit with which they have uniformly encouraged the scientific and literary labours of the distinguished men who have had the good fortune to serve under them in the East, and who for the last half century especially have reflected so much honour upon the service in which they have been employed.

Among these eminent men no one stands more prominent for profound attainments in natural science than Dr. Horsfield, and it is deeply to be lamented that the little encouragement given by the public to works like the present, profound and accurate in research and beautifully illustrated, deprives us of the hope of his indefatigable labours and vast collections being adequately appreciated, except by those who consult the Museum of the East India Company.

The two parts of Dr. Horsfield's work now before us would have been noticed earlier, but from an expectation that we should have had ere this the entire work. But the accuracy which distinguishes all his publications has led to an inevitable delay in the completion of the present one, and we can no longer hesitate to lay before our readers a brief analysis of the portion which has appeared since our first notice.

We hailed the 'Plantæ Javanicæ Rariores' as one of the most important and interesting contributions made in this country to the cause of botany, important from the precious observations which it contained of Mr. Brown upon structure and affinities, and interesting to ourselves from the evidence it afforded of the talents of Mr. Bennett, on whom the labour has principally devolved. Attached as we are personally to that gentleman, not only for his sterling qualities of character, and for the courtesy with which he discharges his duties as Secretary of the Linnæan Society and as Assistant in the Botanical Department of the British Museum, but also as the inheritor of that high and affectionate respect which we and a large circle of naturalists cherished towards his lamented brother, we hailed Dr. Horsfield's work with pride as

affording such unquestionable evidence of Mr. Bennett's claim to a high rank among botanists; and it is with no ordinary emotions of pleasure that we again observe in him that patient study and depth of observation which have so pre-eminently distinguished those remarkable men who have preceded him in connexion with the Banksian Herbarium. He has nobly acquitted himself in the present work of the public responsibility of his situation in our National Museum, and in hailing him as the pupil of Mr. Brown, we cannot award him a higher meed of praise than by saying he is worthy of his intimate association with that great man.

No one aware of the zoological taste and labours of Dr. Horsfield will be surprised at his seeking the assistance of Mr. Bennett in the present work, for no one who has not made botany an exclusive study can, in the present advanced state of the science, do justice to collections, made, like Dr. Horsfield's, between thirty and forty years ago. The determination and description of species has become in itself, to be faithfully done, an arduous undertaking, and how far the present work surpasses a mere detail of them and of genera we can only imperfectly attempt to show by the brief analysis we offer of it.

The two parts before us contain 20 plates and 134 pages of letter-press. A fourth part, with the five remaining plates, &c., will appear in a short time, completing the work. The figures, drawn by Mr. Curtis, are admirable for their precision and elegance.

It is impossible, within the limits assigned to us, to do justice to many parts of the work. We would refer especially to the important observations on *Cyrtandreæ* and the synopsis of its genera, on *Dialium*, &c. &c., and the elaborate article on *Pterocymbium* and its family, to show how thoroughly the respective subjects have been treated, not only with immediate reference to the plant itself, but the historical detail and the remarks on affinities, &c. which arise out of it. Such minute research, learning and accuracy, while they give a sterling and enduring value to Dr. Horsfield's work, equally reflect credit upon the authors and their country; and whatever may be the sense of obligation which Dr. Horsfield entertains for the generous patronage he has met with from the Directors of the East India Company, he may proudly refer to this admirable work, and to his splendid collections at the India House, for the honour he has reflected upon the Company by his scientific labours.

We resume our analysis with the twenty-fifth article, *Loxonia acuminata*, the plate of which was given in the first number, but the text reserved for the second. On the subject of this plant, Mr. Brown enters into a detailed examination of the order *Cyrtandraceæ*, Jack, to which it belongs, and of its affinities, and con-

cludes by referring that order to *Gesneriaceæ*, of which he distinguishes three tribes, viz. *Gesnerieæ*, *Besslerieæ* and *Cyrtandreæ*. Of the latter he describes in detail the modifications of the several organs; and on the subject of the stigma, and the relations of its divisions to the parietal placentæ in the compound ovarium, adds that elaborate and highly important disquisition which we have published entire in our eleventh volume*. A synopsis of the genera of this remarkable tribe is appended to the article; and is followed by the characters of the genera in greater detail, and of the sections into which they are divisible, with an enumeration of the species referable to them, and characters of many new ones.

The next article relates to *Horsfieldia aculeata*, Bl., a genus named in honour of the excellent naturalist to whom we are indebted for the present work. This is described by Mr. Bennett as one of those anomalous genera of *Umbelliferæ*, which scarcely admit of being arranged in any of the existing tribes into which that order has been divided. In many particulars it approaches *Araliaceæ*, and thus serves as an additional link of connexion between the families. With reference to the *Araliaceæ*, the author corrects a mistake originating with Don and adopted by DeCandolle, according to which the seeds of that order are described as erect, while they are in reality pendulous as in *Umbelliferæ*. The valvate æstivation of the corolla is more complete in *Horsfieldia* than in any other true *Umbellifera*.

Tristania obovata is described by Mr. Bennett as the only species of that genus that has yet been discovered beyond the limits of New Holland. It approaches most nearly among described species to *Tristania laurina*.

Euonymus Javanicus, Bl., belongs to that section of the genus in which the seeds continue to retain their original position with reference to the placenta. The general rule, that the raphe properly belongs to that side of the ovulum which is next to the placenta, was first laid down by Mr. Brown, who, at the same time, pointed out some remarkable exceptions. In the case of certain species of *Euonymus*, however, he showed that the exception was confirmatory of the rule, the change taking place subsequent to the completion of the ovula by the resupination of the seeds. M. Adolphe Brongniart has since stated the exceptions to be numerous, and has instanced the families of *Rhamneæ* and *Ilicineæ*; but Mr. Bennett, in the present article, shows that in those families also the raphe in the young ovulum is internal, although at a subsequent period it becomes external or lateral by a greater or less degree of torsion in the funiculus by which the ovulum is

* See p. 35.

attached. The validity of the rule is thus most strongly confirmed by the cases of supposed exception.

In the next article Mr. Bennett establishes a new genus, to which he gives the name of *Stylodiscus*, on the *Andrachne trifoliata* of Roxburgh, a Euphorbiaceous tree extremely abundant throughout the east of Asia and the adjacent islands. It had escaped the author that this genus had been previously published in the 'Edinburgh New Philosophical Journal,' by Messrs. Wight and Arnott, under the name of *Microelus*.

Of the subject of the thirtieth article, *Dialium Indum*, L., Mr. Bennett gives a long historical notice, comparing the genus with *Arouna*, Aubl., and *Codarium*, Sol., with both of which it is most intimately connected. He does not hesitate to retain the union of *Arouna* with *Dialium*, proposed by Vahl and adopted by subsequent botanists; but he is inclined to regard *Codarium* as distinct on account of its rudimentary petal and the adherent stipes of its ovarium. On the latter subject he states that *Codarium* differs from all the other known genera of *Cæsalpineæ* in which the stipes of the ovarium is adherent to the tube of the calyx, by the adhesion taking place anteriorly and corresponding to the odd segment of the calyx and the outer margin of the fruit, while in all the other genera it is posterior, and corresponds with the suture of the legumen. Coincident with this difference there occurs a corresponding difference in the order of the reduction of the stamina; the two remaining stamina in *Codarium* being opposite to the two posterior segments of the calyx, while in the order generally, and especially among *Cæsalpineæ* with adherent stipites, it is usually the posterior stamina that are first lost or become abortive when an irregular reduction takes place. Attention is then directed to a character, which Mr. Bennett states to have been several times pointed out to him by Mr. Brown as affording strong indications of affinity, and consequently useful characters in a systematic point of view, in many of the genera of *Cæsalpineæ*, viz. the sculpture or appearance of sculpture on the surface of the seeds. Of the utility of this character numerous instances are adduced; and the article is concluded by an examination of the origin of the corneous mass which, in so many of the genera of *Cæsalpineæ*, performs the office of albumen.

Another Leguminous genus, to which Mr. Bennett gives the name of *Euchresta*, is established on the *Andira Horsfieldii* of Leschenault. The distinction between this plant and the American genus to which it was previously referred is too striking to permit of their continued association; but *Andira* and *Euchresta*, together with *Geoffroya*, are nevertheless intimately connected. Mr. Bennett discusses at some length their proper position among *Leguminosæ*, and comes to the conclusion that DeCandolle's tribe

of *Geoffreæ* is utterly untenable from the heterogeneous character of the genera assembled under it. The same opinion has been expressed by the late lamented M. Vogel and by Mr. Bentham; and the latter has placed *Geoffroya* and *Andira* in a section of *Dalbergieæ*, distinguished by pendulous seeds and a straight embryo, an arrangement in which (with the addition of *Euchresta*) Mr. Bennett perfectly coincides. He does not, however, agree with Mr. Bentham in placing the genus *Brownea* among *Mimoseæ*, believing that it unquestionably belongs to a remarkable section of *Cæsalpineæ*, characterized by their abruptly pinnated leaves, the two conspicuous bracteæ enveloping the base of their calyx, and the adherence of the stipes of their pod posteriorly to its persistent tubular base.

A singular Hedysareous genus, to which Mr. Bennett has given the name of *Mecopus*, on account of the extreme length of the stipes of its pod, which far exceeds the length of the pod itself, forms the subject of the next article. It comes nearest to *Uraria* and *Eleiotis*; from both of which it differs in the character just indicated, and in the sudden retrofraction of the stipes at its base, by means of which the pod is immersed and the seeds entangled in the compact comose terminal heads which are seated, like so many diminutive birds' nests, at the extremity of its early denuded branches. The only known species, *Mecopus nidulans*, Benn., is *Uraria retrofracta* of Dr. Wallich's List, no. 5678. Mr. Bennett also characterizes another genus related to *Eleiotis* (to which the single species has been referred by Messrs. Wight and Arnott as *Eleiotis Rottleri*) under the name of *Oxydium*. The remainder of the article is devoted to an examination of the various and curious contrivances adopted in the different subdivisions of the Linnæan genus *Hedysarum* for the protection of the pod and its contents during their progress to maturity.

Of these contrivances *Phylacium bracteosum*, another new genus of *Hedysareæ*, and the subject of the following article, affords a remarkable instance. In this curious plant the subtending bracteæ of the floriferous pedicels enlarge very greatly at the time of flowering and during the progress of the fruit to maturity, and at the same time their stipes or petiole bends upwards, while the pedicel of the flower curves downwards. By means of these mutual displacements the flower is brought into relation with the under surface of the bractea, which then folds backwards along its midrib, bringing its margins into contact with each other, and thus forms a compressed cucullate bag for the protection of the flower and fruit. At the period of maturity these enveloping bracteæ readily fall off together with their contents, and doubtless contribute much by their levity to the dispersion of the seeds. Mr. Bennett compares this singular œconomy with that of *Fle-*

mingia strobilifera, of *Zornia*, and of *Geissaspis*, and points out the curious modifications which occur in each in the origin of their bracteæ and in the mode of their application to the protection of the fruit. *Phylacium* differs from all other Hedysareous genera in its climbing habit, by means of which, as well as in some other characters, it approaches *Phaseoleæ*.

Parochetus maculatus, the subject of article thirty-four, is a pretty species of a Papilionaceous genus founded by Buchanan Hamilton, and described in Don's 'Prodromus Floræ Nepalensis,' the immediate affinities of which do not appear to have been yet satisfactorily made out.

Saccopetalum Horsfieldii is described by Mr. Bennett as constituting a new genus of *Annonaceæ*, and forming with *Miliusa*, Lesch., and *Hyalostemma*, Wall., part of a well-marked tribe of that family, characterized by its 3-sepalous calyx, with the three petals of the outer series free and sepaloid, and the three of the inner series cohering valvularly at their edges; the cohesion being so complete and continuing to so late a period as to have induced M. A. DeCandolle and Dr. Wallich to describe *Miliusa* and *Hyalostemma* as gamopetalous. These genera are compared with *Saccopetalum* in reference to their more important organs; and various particulars of structure in other genera of the family are discussed with reference to their arrangement, distinction and relations with each other.

In the two succeeding articles Mr. Bennett describes two species of the genus *Saurauja* of Willdenow, *S. bracteosa*, DeC., and *S. Blumiana*. On the subject of these plants he enters into an examination of their claim to be placed in the family of *Ternstrœmiaceæ*, which (notwithstanding their wide discrepancy from *Ternstrœmia* itself) he is constrained to admit. He calls attention to a remarkable tubular prolongation of the endostome, or that portion of the inner membrane of the seed surrounding its aperture, which fills up the aperture of the testa like a cork in *Saurauja* and other Ternstrœmiaceous genera; and particularly notices the great abundance of acicular crystals or raphides produced between the testa and the inner membrane in *Saurauja*.

The thirty-eighth article has for its subject a very pretty genus of the order *Meliaceæ*, to which Dr. Wight has given the name of *Munronia*. The species here figured is described by Mr. Bennett as the *Munronia Javanica*. One of the plants belonging to this genus was described and figured by Dr. Wallich under the name of *Turræa pinnata*; and this gives occasion to Mr. Bennett to enter at length upon the history of the genus *Turræa*; to examine its characters, comparatively with those of *Munronia*; and to give a synopsis of the two genera, with descriptions of several new species. These genera, together with a nearly related genus

from New Holland named by Mr. Brown *Leptophragma,* and with *Quivisia, Sandoricum* and *Mallea,* deviate from the ordinary relation of parts in having the cells of their ovarium (and consequently their compound central placentæ) opposite to the divisions of the calyx, and not (as in the great majority of *Dicotyledones,* when the number of parts is equal) opposite to the petals. But the ordinary relation recurs in *Melia* and in the entire family of *Cedreleæ,* or at least in all the isomerous genera of that family which Mr. Bennett has had the opportunity of examining.

"In some cases," he remarks, "(as for instance in *Hypericinæ,*) this modification appears to be of ordinal value; but in the present instance, and in *Campanulaceæ,* it is only generic; and in a very remarkable case (*Leptospermum*) pointed out to me by Mr. Brown, both modifications occur in the same genus. The last-mentioned case is more especially deserving of notice, inasmuch as *Leptospermum* is only distinguishable from another genus of the same family (*Fabricia*) by the latter possessing the full complement of cells of the ovarium (that is to say, a number equal to the divisions both of calyx and corolla), and thus combining both modifications in one. In *Turræa* we have a somewhat analogous instance, some of the species having an ovarium consisting of ten cells, or even, according to M. Ad. de Jussieu, of more."

Phoberos of Loureiro, and a species of that genus called by Mr. Bennett *Phoberos Rhinanthera,* as having been formed into a genus by Dr. Blume under the name of *Rhinanthera,* are the subject of the following article. Mr. Bennett gives a detailed history of the genus *Phoberos,* and of others with which it has from time to time been confounded; and enters into an examination of the characters and limits of the family of *Flacourtianeæ* to which it belongs, and of *Bixineæ,* nearly all the genera referred to which he agrees with M. A. Richard and M. Kunth in uniting to *Flacourtianeæ.* He doubts the existence in any genus of the family of that remarkable reticular attachment of the seeds over the entire surface of the cavity of the pericarp, which in the character given by DeCandolle is attributed to the whole family. He believes that *Kuhlia* of Prof. Kunth is not sufficiently distinct from *Azara*; that *Ascra,* Schott, is not essentially different from *Trilix,* L., and that both should be compared with *Banara* and *Prockia*; that *Dasyanthera,* Presl, is not distinct from *Phoberos*; and that *Christannia salicifolia* of the same author is identical with *Pineda incana* of Ruiz and Pavon. Among published genera he rejects from the family *Ryania,* including *Patrisia* (which Mr. Brown has shown to belong to *Passifloreæ,* to which *Erythrospermum* also makes a near approach), *Kiggelaria, Melicytus, Hydnocarpus, Mayna,* Raddi (the two latter, together with *Gynocardia,*

Roxb., forming part of a new family indicated by Mr. Brown and established by Dr. Blume under the name of *Pangieæ*), and *Piparea,* Aubl. (long since determined by Mr. Brown not to be distinct from *Alsodeia*); and adds to it, on the authority of Mr. Brown, *Xylosma,* Forst., of which, as well as of *Banara* and *Prockia,* he gives an amended character. *Prockia serrata,* Willd., described by Swartz under the name of *Lightfootia* (a name preoccupied by L'Héritier), he characterizes under the name of *Thiodia*; and for the *Prockia integrifolia* and *Prockia theæformis* of Willdenow, he adopts as a generic name the sectional name *Aphloia* proposed by DeCandolle. To these species, which are widely distinct from *Prockia,* M. Achille Richard gave about the same time the generic name of *Neumannia.*

The last article of the second part relates to a curious and in some respects anomalous genus established by Dr. Blume under the name of *Polyosma,* and by him referred to *Caprifoliaceæ,* but afterwards placed by DeCandolle in his newly established family of *Corneæ.* Between this family and another previously established by DeCandolle under the name of *Alangieæ,* Mr. Bennett believes the relation to be so intimate, that not even an artificial distinction can be made between them. He compares *Polyosma* with *Cornus, Marlea* and *Alangium,* and calls particular attention to the remarkable changes that take place in the ovarium of *Polyosma* while the fruit is advancing to maturity; that organ being unilocular, and in the young state furnished with two parietal placentæ, each supporting an indefinite number of ovules, which are speedily reduced to a single ascending ovulum with copious albumen and a superior radicle. Mr. Bennett confesses his inability to reconcile these anomalies with the structure of *Corneæ*; but states that he is "indebted to Mr. Brown for directing his attention to another family, with the characters of which, previous to the changes that take place in the ovarium after impregnation, it fully agrees; and to which, especially as regards the structure of ovarium, a point of great importance, it is certainly much more nearly related than to *Corneæ.* Mr. Brown proposes therefore to append *Polyosma* to *Escallonieæ,* notwithstanding its fruit reduced to a single seed, the large size of that seed, and the increased proportion and firmer consistence of its albumen. This approximation receives some confirmation from its resemblance in habit to *Anopterus,* a genus strictly referable to that family." The characters of six species of the genus are given; three of them being from Java, one from the hills adjoining Sylhet, one from Singapore, and one from New South Wales.

The forty-first article, commencing the third part, has for its

subject a Javanese genus, nearly related to *Brucea*, and called *Picrasma* by Dr. Blume. Mr. Bennett points out the differences between this genus and *Brucea*, and adds to it a Nepaulese species doubtfully referred to *Brucea* in Dr. Wallich's List. He regards also as belonging to *Picrasma*, but forming a subgenus, *Nima quassioides* of Buchanan Hamilton, which Don had referred to *Simaba*. He notices several plants that have been from time to time regarded as either actually belonging to *Brucea*, or at least as very intimately related to it. Of these *Lepta* and *Tetradium*, two obscure genera of Loureiro, which have been singularly bandied about by systematic writers, are proved, by the examination of specimens from Loureiro himself, to belong to *Xanthoxylum*, including in that genus *Fagara*, as proposed by M. Kunth. *Xanthoxylum Clava Herculis* of Loureiro (not of Linnæus) is shown on the same authority to belong to a genus distinguished from *Xanthoxylum* by the want of sterile stamina in its female flowers, and its subsessile peltate stigma surmounting two collaterally biovulate ovaria. *Ailantus gracilis* of Salisbury, referred by DeCandolle to *Brucea*, is proved by a specimen from Salisbury himself not to be distinct from *Brucea Sumatrana*, Roxb. With regard to the position of *Brucea* and *Picrasma* in the natural system, Mr. Bennett ventures doubtfully to suggest their approximation to *Simarubeæ*, but professes himself far from satisfied with respect to their real affinities.

Lasiolepis paucijuga, together with a second species, *L. multijuga*, collected by Mr. Cuming in the island of Mindanao, form a new genus, which appears to Mr. Bennett to be closely related to *Harrisonia*, R. Br., and to have no other near affinity. These two genera are also, as M. Adr. de Jussieu has already observed of *Harrisonia*, most nearly related to *Simarubeæ*, although not so closely as to admit of their being absolutely referred to that order.

Pangium edule, Reinw., a tree of great importance in the domestic œconomy of the Malays, and abundantly cultivated throughout the Malayan islands, has hitherto been botanically known only through the character of the genus published by Professor Reinwardt, and by the proposal of Dr. Blume to found on it a family to be named *Pangieæ*, in which he includes the genera *Hydnocarpus* and *Vareca* of Gærtner. This family was some years ago indicated by Mr. Brown in a verbal communication to M. Zuccarini, in which he referred *Hydnocarpus* and *Gynocardia*, Roxb., to a distinct family then unnamed. Of this family, and of the three genera *Pangium*, *Gynocardia* and *Hydnocarpus* (all of which are referred by Prof. Endlicher to *Hydnocarpus*), Mr. Bennett gives detailed and distinctive characters. He agrees with Roxburgh in referring *Vareca*, Gærtn., to *Casearia*; and states that the three species of which Roxburgh has composed

his own genus *Vareca* belong to three distinct genera. Of the first of these, *Vareca Moluccana*, he gives from Roxburgh's specimens the character of the female, which alone appears to have been grown in the Calcutta Garden; Mr. Brown had already, in Dr. Wallich's List, referred the second, *V. lanceolata*, to *Pentaloba*, Lour.; and the third, *V. heteroclita* (also referred by Dr. Wallich to *Pentaloba*), forms a new and very distinct genus in the same remarkable tribe of *Violarieæ*.

The elegant Melastomaceous genus, called *Sonerila* by Roxburgh, forms the subject of the forty-fourth article. The species figured is the *Sonerila tenuifolia*, Bl. The natural relations of this genus were at first strangely misunderstood. Mistaking an expression of Roxburgh's, Sprengel referred it to *Burmannieæ*; and Don, having mixed up with it a species of *Argostemma*, described it as monopetalous, *sui ordinis, Ericeis affine*. Dr. Wallich, however, restored it to its proper position among *Melastomaceæ*. In the subdivision of that family into tribes, it has since been variously placed by different authors; but Mr. Bennett is inclined to regard it as having no close affinity with any other genus of the family, except *Sarcopyramis*, Wall., with which it agrees in all its essential characters, and from which it differs only in points of minor importance. The most remarkable of these characters consists in the opposition of the cells of the ovarium to the teeth of the calyx, which in this case (as in others previously noticed) "appears to be only of generic value; for although it is found in some other Melastomaceous genera with isomerous ovaria, the ordinary relation is also of frequent occurrence in the family, and the difference bears no relation to what appear to be its natural divisions. But combined with this structure there also occurs, in *Sonerila* and *Sarcopyramis*, a curious modification of the apex of the ovarium, which is surmounted by fleshy scales, opposite to the petals and equal to them in number, between which and the free limbus of the calyx-tube the anthers are lodged in their early and deflected stage. These scales, which are at first of small size, become (as the capsule ripens) gradually enlarged, thickened, and of a coriaceous texture." The characters of *Sarcopyramis* are given and compared with those of *Sonerila*, and a synopsis of the species of the latter, as far as known to the author, concludes the article.

The next article concludes the third part of the work. It is a most important memoir by Mr. Brown on the tribe *Sterculieæ*, a new genus of which, named by the author *Pterocymbium*, forms the groundwork of the article. Mr. Brown gives first an elaborate historical account of the tribe, and especially of the genus *Sterculia*, from its formation to the present time, accompanied by critical notes on the successive modifications introduced by

the numerous authors who have treated of it as a whole, or who have made additions to our knowledge of its parts. This is followed by some general observations on the relative importance of the different organs in the formation of genera; in the course of which are noticed some remarkable deviations from the ordinary rule which attaches the highest value to the direction of the embryo with relation to the umbilicus of the seed, and a startling anomaly (not easily reconcileable with the views hitherto entertained of the mode in which a change is effected in the relative position of the foramen of the ovulum) is for the first time pointed out. We copy the passage in which this remarkable phænomenon is described.

"The direction of *Embryo*, with relation to the insertion or umbilicus of the seed, appears to be by far the most important character, or that which is best supported by other modifications of structure; and it is worthy of remark, that in this point the ordinary direction of the embryo in the tribe, namely, the radicle seated at the opposite extremity or apex of the seed, is itself a deviation from the more usual structure of Phænogamous plants, and an exception not only to the other tribes of *Sterculiaceæ*, but to the whole of the natural class *Malvaceæ*, to which that order belongs; and it becomes still more remarkable in regard to the state of the unimpregnated ovulum, which I have some reason to believe is not orthotropous as might be expected, and as it has been described, but apparently anatropous, and that perhaps in the whole tribe. As, however, my observations on this subject are entirely made from the macerated ovaria of dried specimens, the statement here made must be received as requiring confirmation from the examination of living plants, and of a greater number of species*.

"From this ordinary direction of embryo in the tribe the deviations are of two kinds: the first, and no doubt the more important, is that in which the radicle is placed at a point close to the umbilicus, which is the most general structure in Phænogamous plants; but as it never points directly within the umbilicus, either in this or any other family, I have modified the expression generally employed in such cases. The second deviation is where the umbilicus is placed on or near the middle of the ripe seed with the radicle pointing to its lower extremity; in other words, where the embryo is parallel to the umbilicus. But this position of umbilicus of the ripe seed does not necessarily imply

* "The species of *Sterculia*, in which I have found this unexpected position of foramen in the unimpregnated ovulum, are *fœtida*, *guttata*, *carthaginensis*, *nobilis* and *angustifolia*; and in the ripe seeds of *tragacanthæ*, *urens*, *villosa* and *quadrifida*, an indication of a lateral foramen near the base is still visible, but which in *fœtida* I have not been able to detect."

an exactly similar insertion in the unimpregnated ovulum; and in this tribe I am inclined to believe, that in many cases the foramen of the ovulum is so close to the umbilicus as to appear anatropous, and that it ultimately becomes more distant from the unequal growth of the opposite extremities of the seed."

The characters of the tribe *Sterculieæ*, and a synopsis of the genera and species belonging to it, complete the article. Of the genera, three, viz. *Tetradia*, *Pterocymbium* and *Courtenia*, are entirely new, as is also a genus of doubtful position described under the name of *Micrandra*. The whole number of species referred to the tribe is sixty-seven, of which thirty-three are now for the first time described.

PROCEEDINGS OF LEARNED SOCIETIES.

LINNÆAN SOCIETY.

Anniversary Meeting.

May 24, 1844.—The Lord Bishop of Norwich, President, in the Chair.

The President opened the business of the Meeting, and the number of Members whom the Society had lost during the past year having been stated, the Secretary proceeded to read the following notices of some among them.

The deaths among the Fellows have amounted to eight. Among these the first name is that of

William Allen, Esq., a gentleman more distinguished by his investigations in experimental philosophy than by the pursuit of natural history, and still more by that active and unwearied benevolence which has identified his name with almost every recent effort for the amelioration of the condition of mankind. Of such a man we cannot but feel a pleasure in recording that he was for forty-two years a Fellow of this Society, and that, however occupied in other pursuits, he never ceased to take a warm interest in botanical investigations.

His business being that of a chemist, Mr. Allen's attention was naturally directed to that science; and in conjunction with Mr. Pepys he published several valuable chemical papers in the 'Philosophical Transactions' of the Royal Society, of which he became a Fellow in 1807. The first of these, "On the quantity of Carbon in Carbonic Acid and on the Nature of the Diamond," was published in 1807; and was succeeded in 1808 and 1809 by two papers "On the changes produced in Atmospheric Air and Oxygen Gas by Respiration," and in 1829 by another "On the Respiration of Birds,"—subjects which he and his friend Mr. Pepys illustrated by a series of the most delicate experiments.

The only paper contributed by Mr. Allen to our own Transactions was read in May 1805, and contains an account of some experiments made by him on a substance called *Dapéche*, sent to Sir Joseph Banks from South America by M. de Humboldt, which, although very dif-

ferent in external appearance, he determined by analysis to be a mere modification of Caoutchouc.

Mr. Allen was for several years a very popular Lecturer on Experimental Philosophy at the Royal Institution; and for more than twenty years (viz. from 1804 to 1827) he filled the office of Lecturer on the same subject at Guy's Hospital. In 1807, cooperating with the late Mr. Joseph Fox, he first directed his energies to assist in the struggle which Joseph Lancaster was then making to establish his system of mutual instruction; and from this period, his time and attention were by degrees almost wholly devoted to that great undertaking. His death occurred in the 74th year of his age, at Lindfield in Sussex, where he had resided for many years for nearly half his time, occupied in the superintendence of some important experiments for the promotion of an improved condition of the working classes in agriculture by means of education and allotments of land, on which subject he published several interesting essays.

Richard Forester Forester, Esq., M.D., President of the Derby Philosophical Society, and for five-and-forty years a Fellow of the Linnæan Society, died on the 5th of December last, in the 73rd year of his age. He was at the head of his profession in the town of Derby, and took a leading part in most of the useful and benevolent institutions of his neighbourhood; being also the senior magistrate of the county, and an alderman and a magistrate of the borough. He was distinguished for classical attainments and a refined taste; and had formed a collection of fossils which he bequeathed to the Museum of the Derby Society. To the Arboretum so nobly presented to the town by the late Mr. Joseph Strutt (and the formation of which is regarded as one of the most successful labours of another of our Fellows, whom it will be my duty presently to notice more particularly), Dr. Forester bequeathed the sum of 300*l.*, besides several considerable legacies to charitable institutions.

James Barlow Hoy, Esq., who for several years represented the borough of Southampton in Parliament, was much attached to ornithology, and at the time of his melancholy death was on a tour in the Pyrenees, with the object of collecting rare birds. His death, which took place on the 13th of August last, at the Hospice de Vieille, was occasioned by the bursting of his gun while engaged in his favourite pursuit.

John Claudius Loudon, Esq., was born at Cambuslang, in the county of Lanark, on the 8th of April 1783. He was the eldest son of a respectable farmer in the neighbourhood of Edinburgh; and his mother being left a widow with a large family, his exertions were early called forth to assist in providing for their support. At the age of twenty he came to England, and began to practise as a landscape gardener, the profession for which he had been educated, and which he afterwards cultivated with so much success. In 1806 he became a Fellow of the Linnæan Society, and in 1809 resided in Oxfordshire, where he had taken an extensive farm. He subsequently made several tours on the continent, visiting Sweden, Russia, Poland and Austria in 1813, 1814 and 1815, Italy in 1819, and France and

Germany in 1828. During the latter years of his life he resided at Bayswater, in the neighbourhood of London.

Soon after his first arrival in England he was visited by a severe attack of inflammatory rheumatism, which disabled him for two years and terminated in an anchylosed knee and a contracted left arm. During a subsequent attack in 1820 his right arm was broken in the operation of shampooing, and not having properly united was again broken in 1825, when its amputation became necessary. At the same time the thumb and two of the fingers of his left hand were rendered useless. He afterwards suffered frequently from attacks of illness, and died on the 14th of December 1843, of the effects of severe and long-continued disease of the lungs.

Such were the adverse circumstances under which Mr. Loudon commenced and pursued a career of literary labour of no ordinary extent, of much variety of subject, and requiring intense severity of application. His first essay was published in 1803, and for forty years he continued almost without intermission the publication of a series of works, original and compiled, chiefly devoted to agriculture, horticulture and rural architecture, and of a highly useful and practical character. The number and magnitude of these works, the incessant labour required in their production, and the anxieties necessarily attendant on the large outlay of money involved in them, were sufficient to undermine a constitution of far greater strength; but his energy and enthusiasm supported him through every difficulty, and did not desert him even on his death-bed. He has left a widow and one child, a daughter; the former well known by various publications, and especially by her 'Ladies' Flower-Garden' and 'Ladies' Botany.'

James Macartney, Esq., M.D., F.R.S. &c., was born in Armagh in March 1770, and was educated in the country. He was not originally destined for any profession; but in 1794 he apprenticed himself to Dr. Hartigan, then Professor of Anatomy to the Royal College of Surgeons in Ireland. In 1798 he removed to London, where he became Demonstrator of Anatomy in St. Bartholomew's Hospital; and two years afterwards commenced lecturing on Comparative Anatomy and Physiology. This course, of which he published a Prospectus in 1806, was continued until 1810. In the following year he was elected a Fellow of the Royal Society; and having returned to Ireland was in 1813, on the death of his former teacher Dr. Hartigan, elected Professor of Anatomy and Surgery in Trinity College, Dublin, which office he filled for four-and-twenty years. He died of apoplexy on the 6th of March 1843.

Both as a comparative anatomist and an improver of the practice of surgery, Dr. Macartney is entitled to honourable mention. The more important of his contributions to Comparative Anatomy were published in Rees's 'Cyclopædia,' in which the principal articles on that subject were written by him. To the 'Philosophical Transactions' he contributed some valuable "Observations upon Luminous Animals," published in the volume for 1810, and "An Account of an Appendix to the small Intestines of Birds," in that for 1811. A

memoir "On the Anatomy of the Brain of the Chimpanzee" appeared soon after his death in the 'Transactions of the Royal Irish Academy,' of which he had long been an active Member, and to whose Transactions he had previously contributed an essay "On the Curvatures of the Spine." He also made several minor communications to the British Association for the Advancement of Science, and to the Académie de Médécine of Paris, of which he was a Foreign Member. Of the Linnæan Society he became a Fellow in 1814, but he has no paper in our Transactions.

As a lecturer it is stated of him, that "though his manner was unadorned by the arts of verbal eloquence, he became highly popular from the ideas which he imparted, and the distinct and logical language in which they were clothed: his classes were always very large, and by his means the reputation of the Medical School of the University of Dublin was materially elevated." His introductory Lecture to the Anatomical Course of 1824 was published in 1826; and the substance of his Lectures on Inflammation, the most important and original part of his Surgical Course, are given in his 'Treatise on Inflammation,' published the year after he resigned his Professorship. This volume contains an exposition of his views on the proximate cause of inflammation, and of his mode of administering steam fomentations and applying water dressings, now so universally and beneficially adopted in surgical practice.

Charles Saville Onley, Esq.

Simon Stephenson, Esq.

George William Wood, Esq., was the eldest son of the Rev. William Wood of Leeds, an early Fellow of the Society, and the intimate friend of our founder and first President. He was born in 1781, and became connected at an early age with one of the largest establishments in Manchester, of which he continued to be a partner until its dissolution, when he retired from business with a handsome fortune. At the general election for 1832 he was returned to Parliament for the Southern Division of the county of Lancaster, and in 1837 for the borough of Kendal, which he continued to represent till his death. Although endowed with an hereditary fondness for botany and with a strong attachment to geology, the active pursuits of business and the conscientious discharge of his public duties left him little leisure for their cultivation; but he was ever ready to promote the views of those who were more actively engaged in the prosecution of science, and to render them such services as his position enabled him to perform. Of this disposition we have a striking proof in the Bill introduced by him and carried through Parliament in the course of the last Session, the effect of which is to exempt scientific societies from local taxation; a bill for which we have ourselves reason to feel grateful, as relieving our funds from a burthen of some importance. The circumstances of his death may also be referred to as connected with his attachment to science; it occurred suddenly in the rooms of the Literary and Philosophical Society of Manchester, of which he was one of the Vice-Presidents. While engaged in an animated conversation on the progress of the Ordnance

Survey, his breathing was observed to become difficult, and the moment after he was found to be dead.

Among our *Foreign Members* we have to commemorate

Don José Pavon, a botanist of considerable merit, and the colleague of Ruiz in the memorable botanical expedition dispatched to Peru by the Spanish Government in the year 1777, from which were obtained such important results both in collections and publications. On the recommendation of Ortega, then Professor of Botany at Madrid, the expedition was placed under the direction of Ruiz, who was accompanied by Pavon and by two artists, Brunete and Galvez. M. Dombey also, who had been dispatched from France on a similar mission, was allowed to accompany them; and during a residence of ten years they visited many of the most interesting districts of Peru and Chile. In 1788 Ruiz and Pavon returned to Europe, bringing with them large collections of plants and an extensive series of botanical drawings, and leaving behind them two of their pupils, Tafalla (afterwards Professor of Botany in the University of Lima), and Pulgar (an artist of merit), to continue their investigations. The collections thus made by themselves, and those which were subsequently transmitted to them, formed the basis of a series of works on the botany of the Western Regions of South America, which, had they been carried on to completion, would have been indeed a magnificent contribution to science, and which even in their present incomplete state are of high importance. The first of these publications appeared in 1794, under the title of 'Floræ Peruvianæ et Chilensis Prodromus,' and contains descriptive characters and illustrative figures of their new genera. This was followed in 1798 by the first volume of the 'Flora Peruviana et Chilensis,' two other volumes of which, extending as far as the class *Octandria* of the Linnæan system, were published in 1799 and 1802. The plates of a fourth volume, as well as many others intended for subsequent publication, were also prepared. In 1798 also was published the first volume of a smaller work without figures, entitled 'Systema Vegetabilium Floræ Peruvianæ et Chilensis,' containing characters of all their new genera and of the species belonging to them, as well as of all the other species described in the first volume of their 'Flora.'

Of the immense collections made by Ruiz and Pavon and other botanists in the Spanish possessions in America, a large portion was purchased by Mr. Lambert between the years 1817 and 1824. These were dispersed at the sale of his herbarium in 1842; but a part of them was then obtained for the British Museum, where they are now deposited. Little is known of the latter years of Pavon; his correspondence with Mr. Lambert appears to have ceased in 1824, and even the exact date of his death has not been ascertained.

The President also announced that 19 Fellows, 2 Foreign Members, and 1 Associate had been elected since the last Anniversary.

At the election which subsequently took place, the Lord Bishop of Norwich was re-elected President; Edward Forster, Esq., Treasurer; John Joseph Bennett, Esq., Secretary; and Richard Taylor, Esq., Under-Secretary. The following five Fellows were elected into the

Council in the room of others going out: viz. Francis Boott, M.D.; Edward Forbes, Esq., Professor of Botany in King's College, London; the Rev. William Hincks; Daniel Sharpe, Esq.; and William Spence, Esq.

ZOOLOGICAL SOCIETY.

Dec. 12, 1843 (*continued*).—Wm. Yarrell, Esq., V.P., in the Chair.

"Descriptions of new species of Shells figured in the 'Conchologia Iconica,'" by Mr. Lovell Reeve (*continued*).

PLEUROTOMA PICA. *Pleur. testâ crassâ, obtuso-pyramidali, albâ, maculis fuscis, paucis, grandibus, subquadratis, irregulariter variegatâ; anfractibus eleganter semicostatis, costis angustis, numerosis; supernè lævibus, concavis; sinu lato.*

Conch. Icon., *Pleurotoma*, pl. 8. f. 61.

Hab. Island of Capul, Philippines; Cuming.

A very solid white shell, pied here and there with dark brown blotches.

PLEUROTOMA ALABASTER. *Pleur. testâ turritâ, intùs extùsque niveâ, roseo interdum leviter tinctâ, transversìm subtilissimè sulcatâ et striatâ; anfractibus longitudinaliter costatis, supernè subdepressis; sinu lato.*

Conch. Icon., *Pleurotoma*, pl. 8. f. 65.

Hab. Island of Siquijor, Philippines (found in loose coral sand on the reefs at low water); Cuming.

The sculpture of this shell is exceedingly delicate, the cross grooves looking as if they had been graved with an etching-point.

PLEUROTOMA VENUSTA. *Pleur. testâ obeso-fusiformi, flavicante, fusco-maculatâ; anfractibus rotundatis, transversim multicostatis, obliquè maculatis, supernè depressis, maculis majoribus vividè pictis; canali elongato.*

Conch. Icon., *Pleurotoma*, pl. 9. f. 79.

Hab. Island of Siquijor, Philippines (found in coral sand on the reefs at low water); Cuming.

This highly interesting shell, which is at present unique in Mr. Cuming's collection, differs materially, both in form and in the colour and character of the marking, from any of its congeners.

PLEUROTOMA EXIMIA. *Pleur. testâ gracilè fusiformi, albâ, anfractibus convexis, costis angustis longitudinalibus, striisque transversis elevatis, eximiè cancellatâ; sinu subindistincto; canali mediocri, leviter tortuoso.*

Conch. Icon., *Pleurotoma*, pl. 10. f. 82.

Hab. Island of Masbate, Philippines (found under stones at low water); Cuming.

The canal of this Muriciform species, though somewhat indistinct, fully entitles it to a place amongst the *Pleurotomæ*.

PLEUROTOMA ALBIBALTEATA. *Pleur. testâ ovato-oblongâ, luteâ, albibalteatâ, anfractibus convexis, transversè lineatis, longitudinaliter noduloso-costatis; labro incrassato, sinu parvo; canali brevi, recurvo.*

Conch. Icon., *Pleurotoma*, pl. 10. f. 84.

Hab. Island of Ticao, Philippines (found in sand at the depth of six fathoms); Cuming.

Pleurotoma Tritonoides. *Pleur. testâ subovali, apice acuto, fulvâ, pallidè albifasciatâ; anfractibus convexis, costis longitudinalibus, subtilissimè nodulosis, lineis transversis elevatis eximiè cancellatis; labro incrassato, sinu parvo; canali brevi, subrecurvo.*

Conch. Icon., *Pleurotoma*, pl. 10. f. 85.

Hab. Bais, island of Negros, Philippines (found in coral sand at the depth of seven fathoms); Cuming.

This shell is of a duller and more uniform colour than the preceding; the last whorl is more ventricose, and the longitudinal ribs are finer and more numerous.

Pleurotoma abbreviata. *Pleur. testâ abbreviato-fusiformi, cæruleo-albâ, nigro maculatâ et punctatâ; anfractibus medio angulato-carinatis, carinâ medio partitâ, supernè depressis, funiculo maximo nigro-maculato cingulatis, infernè multifuniculatis, funiculis minoribus nigro lineatis et punctatis; canali vix elongato.*

Conch. Icon., *Pleurotoma*, pl. 10. f. 86.

Hab. Island of Masbate, Philippines (found on the reefs at low water); Cuming.

A very interesting species, which looks at first sight like a broken portion of the *Pl. tigrina*. A number of specimens were collected by Mr. Cuming at the above-mentioned island.

Pleurotoma bijubata. *Pleur. testâ cylindraceo-pyramidali, fuscâ, fuscescente carinatâ; anfractibus convexis, æquidistanter carinatis, carinis duabus centralibus jubatis; aperturâ brevi; canali brevissimo.*

Conch. Icon, *Pleurotoma*, pl. 10. f. 87.

Hab. Island of Burias, Philippines (found under stones at low water); Cuming.

Of the two crested keels which encircle this very characteristic species, the upper one is the more faintly developed.

Pleurotoma planilabrum. *Pleur. testâ ovato-oblongâ, apice acuto; rubido-fuscâ; anfractibus convexis, transversè lineatis, longitudinaliter costatis, costis ferè obsoletis; aperturâ oblongâ, labro plano, rubido, intùs denticulato; canali brevissimo.*

Conch. Icon., *Pleurotoma*, pl. 10. f. 88.

Hab. Sibonga, island of Zebu, Philippines (found under stones at low water); Cuming.

The posterior extremity of the lip in this shell is acuminated to a sharp point.

Pleurotoma corusca. *Pleur. testâ subpyramidali, valdè politâ; anfractibus supernè planis, fusco alboque nebulosis, infernè leviter prominentioribus, punctis fuscis irregularibus cingulatis, anfractu ultimo punctorum seriebus duabus cingulato; aperturâ brevi; canali brevissimo.*

Conch. Icon., *Pleurotoma*, pl. 10. f. 89.

Hab. Island of Capul, Philippines; Cuming.

Two specimens only of this shell were found by Mr. Cuming on the reefs at the above-mentioned island.

Pleurotoma Harfordiana. *Pleur. testâ obeso-pyramidali; anfractibus nigerrimis, in medio luteo-balteatis, convexis, transversim subtilissimè striatis, supernè depressiusculis, serie unicâ nodulorum ornatis, infrà noduloso-costatis; aperturâ breviusculâ; sinu parvo, rotundato.*

Conch. Icon., *Pleurotoma*, pl. 11. f. 93.

Pleurotoma Perronii. *Pleur. testâ fusiformi, turritâ, lævisculâ, pallidè luteâ; anfractibus planis, supernè leviter angulatis, ultimo infernè coarctato, transversim lirato, liris regularibus, subdistantibus; sinu subcentrali; canali subelongato, recto.*

Conch. Icon., *Pleurotoma*, pl. 11. f. 94.

Murex Perron, Chemnitz, Conch., vol. x. pl. 164. f. 1573.

This interesting shell has been confounded by Lamarck with the *P. spirata*. It differs from that species in being more erect and fusiform, in the sutures of the whorls being less deeply channeled, and in the lower portion of the last whorl being crossed with about four or five narrow, well-developed ridges.

Pleurotoma pluteata. *Pleur. testâ fusiformi, gracili, fulvâ; anfractibus convexis, pluteo supernè ornatis, medio nodulis albidis catenulatis, infrà subtilissimè sulcatis; sinu lato; canali elongato.*

Conch. Icon., *Pleurotoma*, pl. 12. f. 101.

The shelf which passes round the upper portion of the whorls is not less characteristic of this species than the delicate chain of white nodules which encompass the centre.

Pleurotoma mystica. *Pleur. testâ abbreviato-fusiformi, rubido-fuscâ; anfractibus supernè concavis, striatis, infrà angulatis, tuberculis albis, connatis, ad angulum acutè carinatis; anfractu ultimo infernè nodulorum seriebus plurimis cingulato.*

Conch. Icon., *Pleurotoma*, pl. 12. f. 107.

Chiefly distinguished by the white turreted keel.

Pleurotoma Philippinensis. *Pleur. testâ ovato-turritâ, ventricosâ, subpellucidâ, albidâ; anfractibus sex septemve, longitudinaliter costatis, costis eximiis, subcompressis, subdistantibus, nigro aut fusco alboque variè pictâ; transversim liratis, liris minutis, subcontiguis, numerosis; columellâ subtortuosâ; aperturâ ovatâ, amplâ; canali brevissimo.*

Conch. Icon., *Pleurotoma*, pl. 13. f. 109.

Hab. Islands of Masbate and Luzon, Philippines (found under stones at low water); Cuming.

Pleurotoma Rissoides. *Pleur. testâ elongato-ovali, lævi, nitente, semipellucidâ, albicante, fulvo pallidissimè nebulosè strigatâ; anfractibus septem, tribus longitudinaliter plicatis; apice rubello; columellâ spiraliter tortuosâ; canali brevissimo, leviter recurvo; labro subincrassato, intùs eximiè denticulato, sinu parvo, distincto.*

Conch. Icon., *Pleurotoma*, pl. 13. f. 111.

This species reminds me somewhat of the *Rissoa deformis*; the first whorl or two are plaited as in that shell, the surface is moreover smooth and shining, and they bear a general resemblance to each other in size. The apex of this shell is peculiar in being pink, whilst there is not the least indication of that colour in any other part.

Pleurotoma Boholensis. *Pleur. testâ subelongatâ, tenui, subpellucidâ, albidâ, fulvo subindistinctè virgatâ; anfractibus octo, transversim lineatis et liratis, striis quoque subtilissimè reticulatis; columellâ spiraliter tortuosâ; canali brevissimo, paululùm recurvo; labro simplici, acuto, sinu parvo.*

Conch. Icon., *Pleurotoma*, pl. 13. f. 112.

Hab. Island of Bohol, Philippines (found under stones on the reefs at low water); Cuming.

This shell, which is of a much thinner and slighter composition than either of the two preceding ones, is very finely reticulated over with striæ; and it has a number of lines and ridges running transversely across the whorls, but none longitudinally.

Pleurotoma gracilenta. *Pleur. testâ gracillimè fusiformi, fulvâ, anfractibus convexis, longitudinaliter costellatis, costellis leviter nodulosis, striis elevatiusculis transversis decussatis; labro subflexuoso, sinu lato; canali breviusculo.*

Conch. Icon., *Pleurotoma*, pl. 14. f. 114.

Hab. Loay, island of Bohol, Philippines (dredged from sandy mud at the depth of seventeen fathoms); Cuming.

A shell of simple character, unlike any hitherto-described species, though not presenting any very striking peculiarity.

Pleurotoma pessulata. *Pleur. testâ subacuto-fusiformi, fulvâ vel cinereâ, anfractibus leviter convexis, longitudinaliter costatis, costis subdistantibus, striis transversis subobsoletis decussatis; labro tenui, sinu parvo; canali breviusculo, subrecurvo.*

Conch. Icon., *Pleurotoma*, pl. 14. f. 115.

Hab. Bolinao, island of Luzon, Philippines (dredged from sandy mud at the depth of ten fathoms); Cuming.

Although the ribs in this species are comparatively distant from each other, they vary considerably in this respect in different individuals; the more elongated the shell, the closer the ribs, as shown by the specimens figured.

Pleurotoma contracta. *Pleur. testâ elongato-ovatâ, albidâ; anfractibus plano-convexis, supernè contractis, costellis longitudinalibus numerosis, striisque transversis elevatis eximiè reticulatis; sinu lato, canali brevi.*

Conch. Icon., *Pleurotoma*, pl. 14. f. 116.

Hab. Cagayan, province of Misamis, island of Mindanao, Philippines (dredged from sandy mud at the depth of twenty-five fathoms); Cuming.

This species may be recognized by the peculiar contraction of the whorls near the suture; the sculpture is not much unlike that of the *C. gracilenta*.

Pleurotoma cedo-nulli. *Pleur. testâ lanceolato-fusiformi, eximiè turritâ, apice acuto; griseo-albicante; anfractibus in medio valdè carinatis, carinâ compressâ, pereleganter diadematâ; sinu amplo, canali longissimo.*

Conch. Icon., *Pleurotoma*, pl. 14. f. 117.

Hab. Bay of Panama (found in sandy mud at the depth of ten fathoms); Cuming.

Pleurotoma crassilabrum. *Pleur. testâ ovato-turritâ, flavicante fusco cæruleoque variè zonatâ; anfractibus convexis, superne lævibus, infrà tuberculato-costatis, costis striis transversis elevatiusculis decussatis; aperturâ brevi, subrotundatâ; canali brevi, subtortuoso; labro valdè incrassato, varicoso, intùs acuto, sinu rotundato.*

Conch. Icon., *Pleurotoma*, pl. 14. f. 118 *b* & *c*.

Hab. Island of Ticao, Philippines (found on the reefs); Cuming.

Var. *β*. *Testa incolorata, striis transversis ferè obsoletis.*

Conch. Icon., *Pleurotoma*, pl. 14. f. 118 *a*.

Hab. Island of Masbate, Philippines (dredged from sandy mud at the depth of seven fathoms); Cuming.

The blue and brown colouring of the first variety is very conspicuous between the ribs. The var. *β*, which is colourless, seems to have a thin epidermis upon it.

Pleurotoma Hindsii. *Pleur. testâ ovatâ, subinflatâ, albidâ, fuscescente pallidè variegatâ; anfractibus costis duabus, ultimo costis quatuor, distantibus, cingulatis, costellis numerosis, compressis, eximiè cancellatis; aperturâ ovatâ; canali brevi.*

Conch. Icon., *Pleurotoma*, pl. 14. f. 119.

Hab. Baclayon, island of Bohol, Philippines (found under stones on the reefs at low water); Cuming.

Pleurotoma lactea. *Pleur. testâ ovato-oblongâ, tenui, subinflatâ, lacteâ, costis carinisve rotundatis striisque exilibus cinctâ; labro simplici, acuto; sinu parvo; aperturâ ovatâ, canali brevissimo.*

Conch. Icon., *Pleurotoma*, pl. 15. f. 123.

Hab. Bolinao, island of Luzon, and Gindulman, island of Bohol, Philippines (found under stones at low water); Cuming.

Pleurotoma brevicaudata. *Pleur. testâ abbreviato-fusiformi, solidâ, luteolâ, apice basique fuscescentibus; anfractibus convexis, supernè unicarinatis, infrà bicarinatis, anfractu ultimo multicarinato; labro simplici, acuto; sinu amplo; aperturâ parvâ, brevi, canali breviusculo.*

Conch. Icon., *Pleurotoma*, pl. 15. f. 126.

Hab. Island of Ticao (found on the reefs); Cuming.

This shell reminds one somewhat of the *P. jubata*, but has no indication of the pretty beaded crest which distinguishes that species.

Pleurotoma digitale. *Pleur. testâ obeso-oblongâ, nigerrimo-fuscescente, apicem versus incoloratâ; anfractibus convexis, tuberculis albidis minutis seriatim clathratis; aperturâ breviusculâ, sinu lato.*

Conch. Icon., *Pleurotoma*, pl. 17. f. 138.

Hab. Island of Burias, Philippines (found under stones at low water); Cuming.

Pleurotoma hastula. *Pleur. testâ elongato-fusiformi, solidiusculâ, albidâ, fuscescente sparsim maculatâ; anfractibus liris subtilissimis numerosis cinctis, lirâ centrali lirisque superis majoribus, prominentibus; canali gracili, fissurâ profundâ.*

Conch. Icon., *Pleurotoma*, pl. 17. f. 139.

This species is chiefly characterized by the stout double ridge that encircles each whorl near the suture, and by the central ridge that is formed in place of the slit as the shell advances in growth.

PLEUROTOMA CUPREA. *Pleur. testâ acuminato-turritâ, anfractibus supernè depressis, fuscescentibus, liris nodulosis, subflexuosis, distantibus, longitudinalibus, ornatis; aperturâ brevi, sinu lato.*

Conch. Icon., *Pleurotoma*, pl. 17. f. 140.

The little dark brown flexuous ridges, passing down the whorls of a much lighter brown, have a neat and conspicuous appearance.

PLEUROTOMA VARICOSA. *Pleur. testâ acuminato-turritâ, anfractibus supernè lævibus, infrà longitudinaliter costatis, costis subirregularibus, griseis, interstitiis griseo-cæruleis, transversim striatis, varicibus rudibus lutescentibus grandibus sparsis peculiariter notatis; canali brevissimo, leviter recurvo; sinu lato, subprofundo.*

Conch. Icon., *Pleurotoma*, pl. 17. f. 141.

Hab. Calapan, island of Mindoro, Philippines (found in coarse sand at the depth of fifteen fathoms); Cuming.

Var. β. *Testa omninò fusca.*

Hab. Island of Corrigidor, Philippines (found in coarse sand at the depth of six fathoms); Cuming.

This species may be easily recognized by its prominent display of varices.

PLEUROTOMA CARBONARIA. *Pleur. testâ turritâ, carbonariâ; anfractibus prope suturas depressis, lævibus, infrà costatis, costis angustis, distantibus, nodulosis; columellâ callositate supernè munitâ; canali brevi; sinu latissimo, profundo.*

Conch. Icon., *Pleurotoma*, pl. 17. f. 145.

All the specimens I have seen of this dark Melania-like species have the apex either decorticated or broken away, an indication of their living in brackish water.

PECTUNCULUS SPURCUS. *Pect. testâ subquadrato-ovali, gibbâ, glaucofuscâ, longitudinaliter costatâ, costis numerosis, angustis, subtilissimè striatis; umbonibus albicantibus, obliquis.*

Conch. Icon., *Pectunculus*, pl. 7. f. 36.

Hab. Bay of San Carlos (found in coarse sand at the depth of sixteen fathoms); Cuming.

The width of this little species from the umbones to the margin is comparatively shorter than that of any other species.

PECTUNCULUS PERTUSUS. *Pect. testâ orbiculari, albâ, fusco undatim pictâ; radiatim costatâ, costis subtilissimè pertusis; umbonibus centralibus.*

Conch. Icon., *Pectunculus*, pl. 7. f. 37.

Hab. Islands of Mindanao and Luzon, Philippines (found in coarse sand at the depth of ten fathoms); Cuming.

This interesting little species presents a marked peculiarity in the ribs being finely pricked on each side. Two or three specimens only were collected by Mr. Cuming at the above-mentioned islands.

PECTUNCULUS OCULATUS. *Pect. testâ sub-Pectiniformi, radiatim*

costatâ, fuscâ, maculis albis, supernè nigro-marginatis, sparsim et irregulariter ornatâ; umbonibus centralibus, subobliquis.

Conch. Icon., *Pectunculus*, pl. 7. f. 38.

Hab. West Indies.

PECTUNCULUS CANCELLATUS. *Pect. testâ obliquè Pectiniformi, striis subtilissimè cancellatâ; albâ, epidermide luteâ holosericâ partim indutâ; umbonibus prominentibus, centralibus.*

Conch. Icon., *Pectunculus*, pl. 7. f. 39.

Hab. Singapore (found in sandy mud at the depth of seven to ten fathoms); Cuming.

This little shell is very thin and fragile, and perfectly white; the entire surface being delicately cancellated and covered towards the margin with a thick pale yellow epidermis. There is no possibility of confounding it with any other species.

PECTUNCULUS MORUM. *Pect. testâ sub-Pectiniformi, pallidè purpureo-rubrâ, maculis rubidis elongatis sparsim et irregulariter pictâ; radiatim costatâ, costis lævibus; umbonibus subcentralibus.*

Conch. Icon., *Pectunculus*, pl. 7. f. 40.

Hab. Madagascar?

A very pretty species, in which the ribs radiate somewhat more obliquely than usual; the general appearance of the shell is not much unlike that of the *P. tessellatus*; it is however lighter and more depressed, with colour and spotting of somewhat different character.

PECTUNCULUS SICULUS. *Pect. testâ orbiculari, depressiusculâ, subæquilaterali, longitudinaliter sulcatâ et striatâ; rubido-castaneâ, fusco transversim zonatâ, zonis sæpè obscuris; umbonibus testæ junioris interdum albimaculatis.*

Conch. Icon., *Pectunculus*, pl. 7. f. 41.

Pectunculus glycimeris, Lamarck, Philippi.

Testa junior.

Arca bimaculata, Poli.

Hab. Mediterranean, coast of Sicily.

Having adopted the old *P. glycimeris* of British authors, I distinguish the *P. glycimeris* of Lamarck by the above new title. Through some unaccountable neglect, these two very different shells have been hitherto published under the same title, and it is hoped that this present amendment will be appreciated.

PECTUNCULUS PERDIX. *Pect. testâ orbiculato-cordatâ, subauritâ, radiatim costatâ; costis planulatis, subindistinctis, longitudinaliter striatis, strigis rubido-fuscis, transversis, angulato-undatis, profusè pictis.*

Conch. Icon., *Pectunculus*, pl. 8. f. 46.

Hab. Straits of Malacca (found in mud at the depth of seventeen fathoms); Hinds.

The form of this shell approximates very closely to that of the *Pectunculus zonalis*, but the painting of it is of a very different character. The beautiful specimen here figured, collected by Sir E. Belcher, is the only example of the species I have seen, with the exception of a small, worn, odd valve in the collection of M. Deshayes.

PECTUNCULUS SPADICEUS. *Pect. testâ orbiculari, radiatim striatâ,*

pallidè spadiceâ, umbones versus albâ, strigis latis, undatis, ornatâ; epidermide holosericâ; intus albâ, margine exiliter crenulato.

Conch. Icon., *Pectunculus*, pl. 8. f. 47.

There is no very striking peculiarity in this species, although it is too distinct from any other to require comparison. I have seen several specimens of it, both in London and Paris, but have not succeeded in obtaining its true locality.

Pectunculus formosus. *Pect. testâ lenticulari, subdepressâ, vel lævi vel subobscurè radiatâ, subtilissimè concentricè striatâ; luteo-lactea, maculis sparsis violaceo-purpureis, longitudinaliter inquinatis, formosè pictâ.*

Conch. Icon., *Pectunculus*, pl. 8. f. 48.

There are two or three specimens of this handsome shell at Paris, both in the collection at the Jardin des Plantes and in that of M. Delessert.

Pectunculus sericatus. *Pect. testâ orbiculari, Pectiniformi, depressiusculâ, albidâ, rosaceo-fusco sparsim tinctâ et maculatâ, epidermide sericâ crassâ indutâ; radiatim sulcatâ, sulcis subdistantibus; intus albâ.*

Conch. Icon., *Pectunculus*, pl. 9. f. 49.

Hab. Island of Tortola, West Indies.

This exceedingly delicate shell is remarkable for its glossy silken epidermis; the hinge-shelf in the interior of each valve is nearly as broad and solid as that of the *Pectunculus strigilatus*, and the teeth are as closely set; the shell altogether exhibits many characters in common with that species, but no indication of the peculiar manner in which it is attenuated towards the umbones.

This is the only specimen I have seen at present.

Pectunculus lividus. *Pect. testâ orbiculari, tumidâ, inæquilaterali, anticè angulatâ; longitudinaliter radiatâ, radiis latis, elevatiusculis, subtilissimè striatis, rubido-fuscis, marginem versus lividocæsiis, epidermide pilosâ plus minusve indutis; radiis anticis creberrimis; umbonibus rectè incurvis, maculis albidis perpaucis circumsparsis; intus albâ, medio purpureo-nigricante tinctâ et maculatâ.*

Conch. Icon., *Pectunculus*, pl. 9. f. 51.

Hab. Red Sea.

Pectunculus Delessertii. *Pect. testâ orbiculari, tumidiusculâ, subsolidâ, inæquilaterali, altitudine longitudinem æquante; radiatim sulcatâ, sulcis numerosis, profundis, subtilissimè striatis, liris intermediis subtilissimè granuloso-corrugatis, longitudinaliter incisis; albâ, fasciis pluribus aurantio-brunneis transversim undatâ, intervallis fusco lineato-punctatis; intus albâ, anticè rubido-purpureo tinctâ.*

Conch. Icon., *Pectunculus*, pl. 9. f. 52.

Cardita radula. *Card. testâ subquadrato-oblongâ, albidâ, depressâ, costis tribus et viginti, rubido-fuscis, imbricato-squamosis, squamis fornicatis, semi-erectis, subacutis; costarum interstitiis crenulatis; margine crenato.*

Conch. Icon., *Cardita*, pl. 1. f. 2.

CARDITA PICA. *Card. testâ elongato-ovatâ, gibbâ, albâ, nigro aut fusco variè inquinatâ; costis septemdecim sedecimve, in medio angulatis, subtiliter squamosis; intus albâ, posticè nigerrimo-fuscâ.*

Conch. Icon., *Cardita*, pl. 2. f. 8.

Hab. Island of Guimaras, Philippines (found under stones at low water); Cuming.

There is a peculiarity in the shape and blotching of this shell which entitles it to be distinguished as a new species. Several specimens were collected by Mr. Cuming at the above-mentioned island, singularly agreeing in respect to these characters.

CARDITA GUBERNACULUM. *Card. testâ ovato-oblongâ, depressâ, anticè brevissimâ, angustâ, posticè latissimè rotundatâ, subalatâ; brunneâ, luteo purpureoque umbones versus tinctâ; costis plus minusve squamosis, superioribus perpaucis, majoribus, inferioribus angustis numerosis; intus brunneâ, anticè albicante.*

Var. *β. Testa alba, fusco vix tincta.*

Conch. Icon., *Cardita*, pl. 3. f. 9.

Hab. Zanzibar.

This is the nearest allied species to the *C. semi-orbiculata*; the dark variety might indeed be easily mistaken for it, were it not for the scales and peculiar elongation of the ventral portion of the shell.

CARDITA MARMOREA. *Card. testâ elliptico-ovatâ, posticè rotundatâ, anticè peculiariter brevi; lacteâ, nigro umbones versus maculatâ; costis quindecim sedecimve, recto-elongatiusculè radiantibus, latescentibus; anticis crenatis, intus eburneâ.*

Conch. Icon., *Cardita*, pl. 3. f. 12.

Hab. New Holland.

CARDITA DISTORTA. *Card. testâ elongato-ovatâ, valdè gibbosâ, peculiariter distortâ, luteolâ; costis duodecim aut plurimis, subsquamosis, inferioribus planiusculis.*

Conch. Icon., *Cardita*, pl. 4. f. 13.

Hab. Red Sea; Rüppell.

There are several specimens of this curious species in Mr. Cuming's collection, all singularly distorted in the same manner.

CARDITA SENEGALENSIS. *Card. testâ oblongâ, elongato-ovatâ, fulvâ, epidermide fuscâ indutâ; costis quindecim sedecimve, squamosis, squamis incumbentibus.*

Conch. Icon., *Cardita*, pl. 4. f. 16.

Le jéson? Adanson.

Hab. Senegal.

This shell, which I know to have been brought from Senegal by M. Rang, approaches nearer to the figure and description of *Le jéson* of Adanson than any that has been hitherto assigned to it.

CARDITA VOLUCRIS. *Card. testâ elongatâ, posticè valdè gibbosâ, angulatâ, anticè brevi et coarctato-acuminatâ; viridescente albidâ, posticè nigrâ nigroque maculatâ; costis septemdecim, anticis planulatis, marginem versus evanidis; posticis angulatis, hinc illinc obsoletè squamosis.*

Conch. Icon., *Cardita*, pl. 4. f. 20.

Care should be taken not to confound this species with the young of the *C. pectunculus*. It is a solid well-developed shell, and never exceeds an inch to an inch and a half in length.

CARDITA GIBBOSA. *Card. testâ ovato-oblongâ, solidâ, gibbosâ; albâ, costis septemdecim, fusco-variegatis, transversim radiantibus, rotundatis, exiliter nodulosis.*

Conch. Icon., *Cardita*, pl. 4. f. 21.

This is a solid gibbous shell, the anterior side of which is not so short as in most of the oblong species of the genus.

CARDITA NITIDA. *Card. testâ subquadrato-ovali, eburneâ, maculis cæsiis variegatâ; costis duabus vel tribus et viginti, posticis præcipuè crenatis, interstitiis lineis cæsiis angularibus ornatis.*

Conch. Icon., *Cardita*, pl. 6. f. 27.

Var. β. *Testa maculis rubidis.*

Hab. Misamis, isle of Mindanao, Philippines (found in sandy mud at the depth of twenty-five fathoms); Cuming.

This pretty shell is remarkable on account of the posterior ribs being more strongly crenated than the anterior.

CARDITA OVALIS. *Card. testâ ovatâ, rubido-brunneâ, maculis albis sparsim variegatâ; costis octodecim aut novemdecim, crenatis; posticis lævigatis, interstitiis lineis angularibus ornatis; lunulâ distinctâ.*

Conch. Icon., *Cardita*, pl. 6. f. 28.

Var. β. *Testa alba, maculis cæsiis variegata.*

Hab. Isle of Corrigidor, Philippines (found in coarse sand at the depth of seven fathoms); Cuming.

CARDITA LACUNOSA. *Card. testâ subovatâ, radiatim costatâ, costis undâ vel duabus et viginti, elevatis, valdè compressis, subtiliter muricato-squamosis; interstitiis latiusculis, lacunato-excavatis; albâ, areâ posticali nigerrimo-fuscâ.*

Conch. Icon., *Cardita*, pl. 7. f. 31.

CARDITA CANALICULATA. *Card. testâ suborbiculatâ, luteolâ, fusco variè zonatâ; radiatim costatâ, costis undâ vel duabus et viginti, lateraliter compressis, annulato-serratis, interstitiis excavato-canaliculatis; intus albidâ, fusco pallidè tinctâ.*

Conch. Icon., *Cardita*, pl. 8. f. 40.

Hab. Philippine Islands; Cuming.

The leading features of this species are its rounded form, and the peculiar manner in which the interstices between the ribs are channeled out.

CARDITA ANGISULCATA. *Card. testâ ovatâ, rubido-fusco tinctâ et variegatâ; radiatim costatâ, costis undâ vel duabus et viginti, planis, latiusculis, approximatis, interstitiis angustis, profundè incisis; costis umbones versus annulato-serratis, hinc illinc squamiferis, squamis erectis.*

Conch. Icon., *Cardita*, pl. 8. f. 41.

This species may be easily recognized by the narrow and deeply-

cut interstices between the ribs, which are unusually flat towards the margin.

CARDITA SEMEN. *Card. testâ ovatâ, subcompressâ, tenui, radiatim costatâ, costis plano-convexis; olivaceo-fuscâ.*

Conch. Icon., *Cardita*, pl. 9. f. 43.

Hab. Mexillones, Desert of Atacama, Bolivia (found at the depth of three fathoms); Cuming.

This minute species is the smallest of the genus; it looks like a little radiated seed.

CARDITA NODULOSA. *Card. testâ ovatâ, solidâ, radiatim costatâ, costis duabus vel tribus et viginti, compressis, regulariter nodulosis; lutescente-albâ, prope marginem aurantio tinctâ.*

Conch. Icon., *Cardita*, pl. 9. f. 44.

Hab. Sicily?

This shell may be recognized by the compressed character of the ribs, and the very regular manner in which they are noduled.

CARDITA NAVIFORMIS. *Card. testâ trapezio-ovatâ, subcompressâ, latere postico elongato-recto; radiatim costatâ, costis paululùm curvatis, squamosis; fuscescente.*

Conch. Icon., *Cardita*, pl. 9. f. 45.

Hab. Valparaiso, South America (dredged from sandy mud at the depth of twenty-five fathoms); Cuming.

CARDITA COMPRESSA. *Card. testâ suborbiculari, solidâ, valdè compressâ, epidermide olivaceâ indutâ; radiatim costatâ, costis lævibus, planiusculis, interstitiis angustis.*

Conch. Icon., *Cardita*, pl. 9. f. 46.

Hab. Valparaiso, South America (dredged from coarse sand at the depth of from twenty to sixty fathoms); Cuming.

Several specimens of this little species were found by Mr. Cuming at the great depth above-mentioned; it has the appearance of the *C. borealis* in miniature.

CARDITA FLABELLUM. *Card. testâ flabelliformi, radiatim costatâ, costis leviter serratis; olivaceo-fuscâ.*

Conch. Icon., *Cardita*, pl. 9. f. 47.

Hab. Valparaiso, South America; Cuming.

The peculiar fan-shape of this minute species distinguishes it in an eminent degree from any hitherto described.

CARDITA TEGULATA. *Card. testâ subflabelliformi, radiatim costatâ, costis decem vel undecim, prominentibus, subtiliter squamulosis.*

Conch. Icon., *Cardita*, pl. 9. f. 48.

Hab. Valparaiso, South America (dredged from the depth of twenty-five fathoms); Cuming.

The sculpture of this shell reminds one of a tiled roof.

CARDITA CARDIOIDES. *Card. testâ globosâ, Cardiiformi, radiatim costatâ, costis rotundatis, irregulariter nodulosis, interstitiis subprofundè incisis; albidâ vel aurantiâ, strigis aurantiis latis, transversis, vividè ornatâ.*

Conch. Icon., *Cardita*, pl. 9. f. 49.

Hab. Islands of Corrigidor and Luzon, Philippines (dredged from coarse sand at the depth of seven fathoms); Cuming.

Cardita fabula. *Card. testâ oblongo-ovatâ, latere postico latiore, radiatim costatâ, costis subangulatis; albâ, fusco sparsim maculatâ; intus albâ, posticè fusco-tinctâ.*

Conch. Icon., *Cardita*, pl. 9. f. 50.

Hab. Island of Alboran.

The locality above-mentioned is attached in manuscript to a number of specimens of this little shell in the British Museum from Mr. Broderip's celebrated collection.

Cypricardia serrata. *Cypr. testâ subquadrato-ovatâ, subflexuoso-distortâ, incrementi gradibus laminis fragilibus numerosis, exiliter serratis, peculiariter notatis, interstitiis subtilissimè radiatim sulcatis; pallidè rosaceâ, intus vividè purpureâ.*

Conch. Icon., *Cypricardia*, pl. 1. f. 5.

No figure nor description can do justice to this beautiful shell, so remarkable on account of the delicacy of the pink serrated laminæ.

Cypricardia decussata. *Cypr. testâ elongato-ovatâ, regulariter convexâ, tenui, albâ, semipellucidâ, striis exilibus, undulatis, elevatis, obliquè decussatis, ornatâ.*

Conch. Icon., *Cypricardia*, pl. 1. f. 6.

This is evidently one of the terebrating species, belonging to that section of the genus which De Blainville distinguishes by the new generic title of *Coralliophaga*.

The term *decussated* is here used in its strictest and proper sense, signifying *oblique* crossing, as in the letter X.

Cypricardia vellicata. *Cypr. testâ oblongo-ovatâ, compressâ, prope marginem ventralem anticam peculiariter vellicatâ; albâ, latere postico purpureo-fusco plus minusve vividè radiato; umbonibus purpureo-fuscis.*

Conch. Icon., *Cypricardia*, pl. 2. f. 7.

Hab. Calbayog, island of Samar, Philippines (found on soft slaty stones at low water); Cuming.

Cypricardia incarnata. *Cypr. testâ oblongo-ovatâ, tenui, plano-convexâ, liris planis subtilissimis numerosis ab umbonibus undulatim divergentibus, eximiè notatâ; albidâ, posticè incarnatâ.*

Conch. Icon., *Cypricardia*, pl. 2. f. 8.

Hab. Island of Burias, Philippines (found under a stone at low water); Cuming.

The surpassing delicacy of the ridges is exceedingly characteristic in this species; instead of looking raised upon the surface, they have all the appearance of undulating rays of light.

Cypricardia laminata. *Cypr. testâ trapezio-oblongâ, tenui, albâ, latere postico valdè latiore, rotundato, compresso, laminis duabus vel tribus elevatis subdistantibus fimbriato.*

Conch. Icon., *Cypricardia*, pl. 2. f. 9.

Hab. Lord Hood's Island, Pacific Ocean (found at the depth of

five fathoms piercing, and partially imbedded in, the *Avicula margaritifera*); Cuming.

This peculiarly shaped shell exhibits the same kind of delicate marginal frill of laminæ as the well-known *Cypricardia coralliophaga*, and belongs to a mollusk of the same terebrating habits. The shells of terebrating mollusks vary so exceedingly in form, according to circumstances of situation, &c., that were the *C. laminata* not entirely destitute of the fine radiating striæ which characterise the *C. coralliophaga*, it might be regarded as a modification of that species.

Cypricardia obesa. *Cypr. testâ subquadrato-ovatâ, valdè gibbosâ, tumidâ, latere postico subobliquè angulato; longitudinaliter striatâ, striis profundè incisis; lutescente-albâ.*

Conch. Icon., *Cypricardia*, pl. 2. f. 10.

Cypricardia Solenoides. *Cypr. testâ angustatâ, Soleniformi, latere postico plano-angulato; albâ, posticè purpureo-fusco obsoletè radiatâ; umbonibus purpureo-fuscis; intus albâ, ad extremitatem posticam purpureo-violaceo tinctâ.*

Conch. Icon., *Cypricardia*, pl. 2. f. 11.

Hab. Calbayog, island of Samar, Philippines (found piercing soft slaty rocks; low water); Cuming.

The *Cypricardia Solenoides*, though approximating greatly in form to the *Cypricardia coralliophaga*, differs materially in structure and composition; the two species indeed exhibit all the differences upon which De Blainville founded his genus *Coralliophaga*. Instead of presenting that pellucid tenuity which seems peculiar to the terebrating species, it is of the same solid opake structure as the *Cypricardia vellicata*, the umbones have the same purplish-brown patch upon them, and there is an evident indication of the same posterior streaks of that colour.

MISCELLANEOUS.

CIRSIUM SETOSUM, M. BIEB.

This plant has recently been found by Dr. Dewar of Dunfermline on the shore of the Firth of Forth near Culross, in considerable quantity. It has probably been introduced from Odessa with merchandise, but is now quite established in Scotland. It is very satisfactory to me to learn that Sir W. Hooker, who possesses authentic specimens of M. Bieberstein's plant, has come to the same conclusion which I had done concerning the identity of the plant gathered by Dr. Dewar and that described in the 'Flora Tauro-Caucasica.'—C. C. B.

ALSINE STRICTA, WAHL.

A few weeks since, my friend Mr. Jas. Backhouse, jun. of York kindly sent me a specimen of *A. stricta*, which had been just discovered on Widdy Bank Fell, on the Durham side of the upper part of Teesdale, by a party of botanists, consisting of Messrs. John Tatham, jun. of Settle, G. S. Gibson of Saffron Walden, S. Thompson, and Jas. Backhouse, sen. and jun. of York. Growing in so utterly wild

a country, and being a native of Germany and the northern parts of Europe, it must be considered as one of the most interesting additions that has been recently made to our native flora.—C. C. B.

TEGUMENTS OF GASTEROPOD MOLLUSCA.

Among the kinds of covering of Gasteropod Mollusca, no solid bodies have been noticed but such as are known under the name of Shells. In two genera near to *Doris*, all the fleshy part of the body is strewed in every direction with calcareous spiculæ. In one of them, these spiculæ stick out in such a manner that the animal has its body all bristled with prickles. Similar spiculæ have been met with in the mantle of a young *Bulla*. At a time when, thanks to the labours of Ehrenberg, the study of microscopic fossils has made an unexpected stride, these facts may be of some value in guarding zoologists against referring to Infusoria the remains of animals belonging to a much higher group.—*Comptes Rendus*, July 15, 1844.

NEST OF THE DINORNIS.

Description by Captains Cook and Flinders of Birds' Nests of enormous size on the coast of New Holland; by Prof. Edward Hitchcock, Dec. 22, 1843.

In lecturing on the huge footmarks of sandstone in the Connecticut valley, I have been in the habit for many years of reading to my classes, *as the poetry of the subject*, some statements from the twelfth volume of the 'Athenæum, or Spirit of the English Magazines' (p. 48), respecting enormously large birds and birds' nests. As some of these statements are manifestly fabulous, it never occurred to me till today to inquire whether any of them were true. I was led to make the inquiry probably by the astonishing discoveries of Prof. Owen respecting the *danger bird* of New Zealand; and the result is, that I have almost persuaded myself, that with the help of Captains Cook and Flinders *I have found the nest of the Dinornis on the coast of New Holland.* These navigators have given the following statements in their published voyages. I quote Cook's account from Kerr's 'Collection of Voyages and Travels,' vol. xiii. p. 318. It was Cook's first voyage. Lizard Island is near the north-east coast of New Holland, not far from Cape Flattery, and in about 15° S. lat.

"At two in the afternoon," says Cook, "there being no hope of clear weather, we set out from Lizard Island to return to the ship, and in our way landed upon the low sandy island with trees upon it which we had remarked in our going out. Upon this island we saw an incredible number of birds, chiefly sea-fowl; we found also the nest of an eagle with young ones, which we killed; and the nest of some other bird, we knew not what, of a most enormous size. It was built with sticks upon the ground, and was no less than six and twenty feet in circumference, and two feet eight inches high. To this spot we gave the name of Eagle Island," &c.

Capt. Flinders found two similar nests on the south coast of New Holland in King George's Bay. Not having his work at hand, I quote from the 'Quarterly Review' for October 1814 his description of these nests:—

"They were built upon the ground, from which they rose above two feet, and were of vast circumference and great interior capacity; the branches of trees and other matter of which each nest was composed being enough to fill a cart."

Now I suppose, from the character of Captains Cook and Flinders, we may place implicit confidence in the truth of these accounts. Indeed, Cook was accompanied to Eagle Island by Sir Joseph Banks. Equally certain is it that no known bird but the Dinornis would have built so enormous a nest. I am led therefore almost irresistibly to inquire whether the Dinornis may not be an inhabitant of the coast of New Holland, and still alive! Even if extinct upon New Zealand, it may have remained longer in the warmer climate of New Holland. It may be that these nests have been accounted for in some other way; but if so, I have seen no other explanation.

P.S. *Feb.* 1844.—Having occasion to give a lecture this winter before the Young Men's Association in Troy, N. Y., I had a drawing made of the Dinornis of the natural size, on the type of the Apteryx and Cassowary, and also of one of the nests described above, and I assure you that the nest was only of a *respectable size* for a bird sixteen feet high.—*Silliman's Journal*, July 1844.

METEOROLOGICAL OBSERVATIONS FOR AUGUST 1844.

Chiswick.—August 1. Cloudy: boisterous: clear. 2. Clear and very fine. 3. Showery: boisterous. 4. Dusky clouds: clear and fine. 5. Cloudy and fine: rain. 6. Boisterous: clear and fine. 7. Clear: heavy shower at noon: clear and fine. 8, 9. Fine. 10. Slight haze: fine. 11. Very fine: rain. 12. Heavy rain. 13. Showery. 14. Rain: heavy squall: clear and fine at night. 15. Cloudy. 16. Very fine. 17. Densely overcast. 18, 19. Very fine. 20. Overcast: fine. 21—25. Cloudy and fine. 26. Cloudy. 27. Cloudy and dry. 28. Clear, with hot sun. 29. Cloudless and hot. 30. Fine. 31. Hot and dry.—Mean temperature of the month 2°·57 below the average.

Boston.—Aug. 1. Cloudy: rain early A.M.: rain A.M. 2. Fine. 3. Rain: rain early A.M.: rain with thunder and lightning A.M.: rain P.M. 4. Cloudy. 5. Fine: rain at night. 6. Cloudy. 7. Stormy: rain early A.M.: rain with thunder and lightning A.M. 8. Windy: rain A.M. 9. Windy. 10. Fine. 11. Fine: rain P.M. 12. Rain. 13. Fine. 14. Rain: rain early A.M.: rain A.M. and P.M. 15. Cloudy: rain early A.M. 16. Fine: rain P.M. 17. Cloudy. 18—21. Fine. 22—24. Cloudy. 25. Fine. 26. Cloudy. 27—31. Fine.

Sandwick Manse, Orkney.—Aug. 1. Cloudy: rain. 2. Bright: clear. 3. Showers: drizzle. 4. Damp: drizzle. 5. Cloudy. 6. Cloudy: rain. 7. Showers: cloudy. 8. Cloudy: showers. 9. Showers. 10—13. Bright: clear. 14. Bright: clear: fine. 15. Clear: fine. 16. Bright: cloudy: fine. 17. Showers: rain. 18. Bright: cloudy. 19. Bright: damp. 20. Showers. 21. Rain: drizzle. 22. Rain: damp. 23. Damp. 24. Damp: cloudy. 25. Bright: cloudy. 26. Drizzle: drops. 27. Drizzle: showers. 28. Bright: clear. 29. Clear. 30. Clear: warm. 31. Clear: cloudy: warm.

Applegarth Manse, Dumfries-shire.—Aug. 1—3. Showers. 4. Fair. 5. Fine. 6, 7. Heavy rain. 8. Rain A.M.: fair P.M. 9. A shower. 10. Fair A.M.: few drops P.M. 11. Fair A.M.: rain P.M. 12. Fair. 13. Showery. 14. Showery: thunder. 15. Fair. 16. Rain P.M. 17. Heavy showers. 18. Fair and clear. 19. Heavy showers. 20. Fair. 21. Fair: a few drops. 22. Rain. 23. Heavy shower P.M. 24. One shower. 25—31. Fair and fine.

Mean temperature of the month	54°·6
Mean temperature of Aug. 1843	58 ·0
Mean temperature of spring-water	52 ·5
Mean temperature of ditto Aug. 1843	53 ·5

Meteorological Observations made by Mr. Thompson *at the Garden of the Horticultural Society at* Chiswick, *near London; by* Mr. Veall, *at* Boston; *by the* Rev. W. Dunbar, *at Applegarth Manse,* Dumfries-shire; *and by the* Rev. C. Clouston, *at Sandwick Manse,* Orkney.

Days of Month.	Barometer.							Thermometer.							Wind.				Rain.			
	Chiswick.		Boston. 8¾ a.m.	Dumfries-shire.		Orkney, Sandwick.		Chiswick.		Boston. 8¾ a.m.	Dumfries-shire.		Orkney, Sandwick.		Chiswick. 1 p.m.	Boston.	Dumfries-shire.	Orkney, Sandwick.	Chiswick.	Boston.	Dumfries-shire.	Orkney, Sandwick.
1844. Aug.	Max.	Min.		9 a.m.	9 p.m.	9½ a.m.	8½ p.m.	Max.	Min.		Max.	Min.	9½ a.m.	8½ p.m.								
1.	29·807	29·732	29·15	29·42	29·55	29·51	29·50	71	45	57	59½	51	57	53	w.	w.	ssw.	w.	·02	·21	.....	·48
2.	29·868	29·774	29·29	29·67	29·68	29·66	29·71	72	49	60	61	46½	56	54	w.	w.	sw.	w.	·11	·04	.....	·22
3.	29·469	29·427	29·03	29·40	29·34	29·58	29·56	69	52	57	55	40	54½	53	sw.	s.	e.	ne.	·15	·10	.....	·04
4.	29·833	29·683	29·05	29·49	29·61	29·58	29·71	77	44	58	62	50	56½	52½	w.	nw.	w.	ne.	·01	·41	.....	.....
5.	29·833	29·632	29·19	29·70	29·63	29·79	29·79	72	57	64	65½	52	59	53	s.	calm	e.	e.	·37	.....	.....	·07
☾ 6.	29·587	29·522	28·81	29·24	29·00	29·66	29·44	71	52	66	65	53	57	54	sw.	sw.	se.	e.	·02	·37	.....	.....
7.	29·656	29·621	29·00	29·15	29·25	29·14	29·10	71	50	62	56½	50½	55	54½	sw.	w.	w.	e.	·12	·03	0·75	·45
8.	29·712	29·614	29·03	29·23	29·38	29·13	29·33	72	47	61·5	60½	51	59	54	w.	w.	w.	nnw.	.....	·02	.....	·17
9.	29·756	29·733	29·16	29·53	29·54	29·46	29·52	74	45	62	57½	51	49½	52½	sw.	w.	wsw.	nw.	.....	·04	.....	·14
10.	29·744	29·591	29·14	29·53	29·59	29·60	29·66	76	41	61	65½	43	57	51½	n.	calm	w to n	nw.	.....	.....	.....	·10
11.	29·783	29·550	29·27	29·60	29·50	29·65	29·67	73	54	61·5	59½	39½	53½	49	sw.	calm	s.	se.	·12	.....	.....	.....
12.	29·608	29·374	28·80	29·43	29·53	29·67	29·66	70	54	61·5	63½	52	55½	51½	w.	calm	ne.	e.	·33	·40	.....	.....
13.	29·641	29·531	29·07	29·45	29·35	29·56	29·48	65	51	60	64	49	58	51	sw.	calm	sw.	e.	·24	.....	.....	.....
● 14.	29·424	29·331	28·80	29·18	29·35	29·43	29·56	65	49	57	62½	49	59	51	w.	calm	nw.	.....	·30	·25	0·30	.....
15.	29·744	29·552	29·04	29·52	29·68	29·68	29·75	68	47	57	63	49	56	55	nw.	nw.	nw.	n.	·03	·49	.....	.....
16.	29·919	29·836	29·31	29·75	29·53	29·77	29·71	77	57	60	58	44	56	53½	w.	w.	w.	.....	·01	.....	.....	.....
17.	29·880	29·768	29·11	29·50	29·74	29·63	29·74	69	47	61	59½	50	52	50	w.	w.	nw.	nw.	.....	·21	.....	.....
18.	30·092	30·060	29·56	29·92	30·04	29·97	30·08	69	43	59·5	63½	44	49½	52	nw.	nw.	nw.	nw.	.....	.....	.....	·30
19.	30·119	30·041	29·52	30·02	29·82	29·98	29·78	72	60	58	60	47½	54	53	w.	nw.	sw.	se.	·01	.....	.....	.....
20.	29·901	29·768	29·20	29·72	29·63	29·60	29·63	78	51	67	57	48	50	49	w.	w.	nw.	nnw.	.....	.....	.....	·09
☽ 21.	29·747	29·727	29·10	29·58	29·58	29·59	29·60	65	52	58	57½	50	51	49	w.	calm	nw.	n.	.....	.....	.....	·42
22.	29·727	29·698	29·12	29·53	29·52	29·57	29·55	67	42	57	58	50	51	52	w.	calm	w.	.....	.....	.....	0·95	·30
23.	29·726	29·673	29·16	29·49	29·57	29·59	29·67	69	38	58	64	49	55	51½	sw.	calm	nw.	se.	.....	.....	.....	·04
24.	29·746	29·659	29·13	29·65	29·70	29·76	29·80	71	49	58·5	60	45	56	52	sw.	calm	w.	w.	.....	.....	.....	·04
25.	29·976	29·902	29·25	29·79	29·84	29·81	29·85	73	50	57	61	47	54	50½	nw.	calm	nw.	wnw.	.....	.....	.....	.....
26.	30·052	30·007	29·39	29·84	29·92	29·85	29·88	66	47	58	60	41	54	48½	nw.	w.	nw.	wnw.	.....	.....	.....	.....
27.	30·082	30·078	29·50	29·98	30·00	29·94	30·03	71	38	56	65	39	51	49½	w.	calm	sw.	nw.	.....	.....	.....	.....
○ 28.	30·137	30·110	29·59	30·05	30·06	30·05	30·08	78	40	53	68	43	51	53	w.	calm	sw.	w.	.....	.....	.....	.....
29.	30·138	30·113	29·58	30·06	30·01	30·08	30·03	79	42	60	68½	47	57½	54	e.	calm	w.	.....	.....	.....	.....	.....
30.	30·182	30·127	29·55	30·04	30·07	30·03	30·09	72	42	61	68	46½	59	56	e.	calm	sw.	w.	.....	.....	0·18	.....
31.	30·292	30·278	29·71	30·20	30·21	30·22	30·22	80	44	61·5	70	48	57½	54	se.	calm	sw.	se.	.....	.....	.....	.....
Mean.	29·844	29·758	29·21	29·627	29·636	29·146	29·199	71·67	47·71	59·6	61·5	47·2	54·87	52·16					1·84	2·57	2·18	2·86

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XXXVII.—*On a new Genus of Palæozoic Shells.* By WILLIAM KING, Curator of the Museum of the Natural History Society of Northumberland, Durham and Newcastle-upon-Tyne.

To the Editors of the Annals of Natural History.

GENTLEMEN,

IN a 'Monograph of the Invertebrate Fossils of the Magnesian Limestone of the County of Durham' which I am preparing for publication, I have been compelled to institute six new genera, namely, *Allorisma* for species represented by *Sanguinolaria sulcata*, Ph., *Strophalosia* for a Productus-like shell with an area, and possessing a condyloid hinge as in the Terebratulas, and not a simple one as in the true Productuses; *Camerophoria* for a Brachiopod approximating to *Pentamerus* in some points of its internal structure; *Pleurophorus* for *Arca costata* of Capt. Brown; *Schizodus* for the Permian and carboniferous Axinuses, to distinguish them from the London clay *Axinus angulatus*, and *Anthracosia* for a group of *Unionidæ* characteristic of the coal-measures.

In the following paper I have given the generic character, &c. of *Allorisma*.

I may add that the monograph will contain figures of the dental and other characters of all the new genera.

I have the honour to be, Gentlemen,
Your very obedient servant,

Newcastle, Museum, Oct. 4, 1844. WM. KING.

In the carboniferous system of some districts, certain shells abound which are elongated in the direction of their cardinal line, and often marked with deep broad wrinkles running parallel with their free margins. Following J. de C. Sowerby, they have in general been placed in the genus *Sanguinolaria*, which cannot be continued, since the existing species bearing this name are furnished with teeth which are absent in the carboniferous shells.

An examination of several of these fossils has convinced me

that each valve is provided with a cartilage fulcrum which varies considerably in different species. In some it resembles that of *Pholadomya* and *Panopæa*, being more or less folded upon itself, and somewhat horizontal with the dorsal plane of the shell, and having the appearance of a callosity; in others its free margin sinks a little below the hinge line; while in the remainder it becomes unfolded and lamelliform, and is directed so much downwards as to hang vertically in the dorsal cavity of the shell. The cartilage consequently passes from an external to an internal position.

It will be seen from this description that the cartilage fulcra *gradually* change from one extreme to the other,—a fact which, viewed in connexion with the uniformity of their external characters, completely prevents these shells being grouped into more genera than one.

In rocks of the Devonian and the Permian system similar fossils have been discovered; and the Triassic deposits of continental Europe, especially the muschelkalk, yield somewhat analogous forms (*Myacites*). Through the Permian and Triassic shells a passage is opened into the genera *Panopæa* (*Lutraria gibbosa*, Sow.), *Lysianassa* (*Mya v-scripta*, Sow.), and *Cercomya* (*Sanguinolaria undulata*, Sow.*) of the Jurassic system. Associated with the latter occurs the genus *Pholadomya*, which though it agrees with the shells just mentioned in its cartilage fulcra, differs, perhaps with the exception of *Cercomya*, in being unprovided with teeth: in this respect the genus *Pholadomya* corresponds with the so-called Sanguinolarias of the carboniferous rocks, but in general it may be readily distinguished from them by the presence of ribs proceeding from the umbones.

Many of the Jurassic Panopæas differ from those at present existing, not only in their being slightly gaping, but in their teeth being expanded and in being concave on the upper side: in some species (*Panopæa* (*Lutraria*) *gibbosa*, Sow.) the teeth appear to be but rudimentary, or mere folds of the cardinal margins beneath the umbones; in this respect they offer an approximation to the carboniferous fossils. It will thus be obvious how difficult it is to draw the line of demarcation between the genus about to be proposed and the Jurassic Panopæas, and how perplexing it is to decide as to the genus in which certain intermediate forms ought to be placed. This last remark applies to the fossils termed *Myacites*, which until it is known whether or not they are furnished with teeth, their identity with *Panopæa* or with the carboniferous

* Mr. Morris, in placing this shell in *Anatina* (vide Cat. Brit. Fossils, p. 77), has overlooked the fact of this genus having the cartilage placed on internal spoon-shaped fulcra. Sowerby's figure of the fossil (Min. Con. tab. 548. fig. 1.) shows that the fulcra are external.

fossils will remain uncertain: from their geological age and their resemblance to a magnesian limestone species which certainly does not possess any appearance of teeth, they may for the present be grouped with the latter. Whether any of these edentulous shells characterise the lias and the oolite is a question on which it is difficult to decide: the valve which Goldfuss has figured under the name of *Lutraria decurtata* (Petrefacten, tab. 153. fig. 3*c*), appears to be unprovided with a tooth, but it must be observed, that in the corresponding valve of *Panopæa gibbosa* and some other species this part is scarcely developed; it is the opposite one which possesses the largest tooth.

If the genus *Panopæa* be allowed to comprise species with conical (*P. norwegica*) or expanded teeth (*P. gentilis*, *P. gibbosa*), whether gaping little or much posteriorly, their being dentigerous will form a good distinguishing character by which to separate them from the edentulous Panopæa-like shells of the carboniferous rocks: add to this, the disparity between their cartilage fulcra, which in the former are constant in form and direction, while in the latter they are extremely variable in these respects. On a consideration of these differences it is proposed to group the carboniferous shells under the following genus:—

*Allorisma**, nobis.

Syn.—? *Myacites*, Schlotheim; *Hiatella* (*sulcata*), Fleming; *Sanguinolaria* (*gibbosa* in the Min. Conch.), J. de C. Sowerby and others; *Unio* (*Urii* in Prestwich's Memoir), J. de C. Sow.; *Lutraria* (*prisca*), Goldfuss; *Pholadomya* (*elongata* in Silliman's Journal, vol. xxix.), Dr. S. G. Morton; ? *Mya* (*rotundata* in Murchison's 'Silurian System'), J. de C. Sow.; ? *Posidonomya* (*transversa*), Portlock.

Order Lamellibranchiata, Blainville.

Suborder Dimyaria, Rang.

Family Pholadomyidæ†, nobis.

Gen. Char.—Both valves furnished with a cartilage fulcrum elongated in the direction of the cardinal line, and which varies breadthwise in different species, from being horizontal with the

* From ἀλλοῖος, *variable*, and ἔρεισμα, *support*—expressive of the variable nature of the cartilage support or fulcrum.

† Blainville's family *Pyloridæ* is so heterogeneous that I have taken the liberty to propose that of *Pholadomyidæ* for the genera *Pholadomya*, *Allorisma*, *Panopæa*, *Lysianassa* (Munster), and *Cercomya* (Agassiz). In doing this, I am aware of the anatomical differences between *Panopæa* and *Pholadomya*, so ably worked out by Valenciennes and Owen; but they do not appear to be of such importance as to warrant the placing of these two genera in distinct families.

dorsal plane of the shell to an internal and vertical position. Neither of the valves furnished with teeth.

General Summary.—The various species at present known of this genus are elliptical, equivalved, and more or less inequilateral (extremely so in *Allorisma* (*Sanguinolaria*) *undata*, Portl.): their umbones are large in *A.* (*Pholadomya*) *Munsteri* (D'Archiac and De Verneuil), but small in others; often they are strongly wrinkled parallel with their free margins, as in the genus *Posidonomya*: some appear to be closed at both ends (*A. elongata*, Mort.), while others gape anteriorly and posteriorly (*A. constricta*, nob.).

Allorisma in one essential point differs from every other genus of *Pholadomyidæ*: in the latter the cartilage fulcra are constantly horizontal with the dorsal plane of the shell,—consequently they support an external cartilage, whereas in the former they are variable; being horizontal in *Allorisma elongata*, vertical in *A. sulcata**, and intermediate in *A. constricta*.

The situation of the adductor and other muscular impressions relatively to each other is nearly the same as in *Thracia pubescens*: the anterior muscular impressions are so strongly marked in some species (*A. sulcata* and *A. undata*) as to give rise to a well-defined ridge which separates them from the umbonial cavity; in most of the species that have passed under my notice the pallial line is rather indistinct: in *Allorisma elongata* the inflexion of the siphonal muscular impression is deep, and runs parallel with the ventral and the dorsal line of the shell somewhat as in *Mya arenaria*.

The surface of the shell is marked with minute pimples, which in some species (*A. elongata* and *A. elegans*, nobis) run in lines from the umbones, but in others (*A. constricta*) they are irregularly arranged, as in *Anatina subrostrata*.

Supplementary Notes.

Schlotheim's name *Myacites* implies that the shells so called are *fossil* Myas; as this is not the case the name cannot stand.

Allorisma elegans is a new species from the magnesian limestone of Durham.

Allorisma constricta is an undescribed carboniferous species from Northumberland.

The species called *Allorisma sulcata* (*Hiatella*, Flem., *Sanguinolaria*, Ph.) is the one figured by Professor Phillips in his 'Geology

* A figure of this species, representing one of its cartilage fulcra, will be given in the Monograph. I may just observe, that in a specimen of this shell three inches long, the fulcra are nearly a quarter of an inch in breadth a little behind the umbone, and about an inch in length.

of Yorkshire,' vol. ii. pl. 5. fig. 5: externally it closely resembles another species which I consider the same as Dr. Morton's fossil represented in Silliman's Journal, vol. xxix. pl. 26. fig. 37, and which is from the carboniferous rocks of Northumberland; but the direction of the cartilage fulcra, as already noticed, is very different in each.

I have little doubt of the fossil to which Mr. J. de C. Sowerby has applied Fleming's name *Unio Urii* (Brit. Animals, p. 417) being quite distinct from the shell so called, and a true *Allorisma*. In this case the specific name which Mr. Sowerby has given to the former may be retained, unless this fossil should hereafter be considered as a variety of *Allorisma elongata*.

XXXVIII.—*Catalogue of Irish Entozoa, with observations.* By O'Bryen Bellingham, M.D., Fellow of and Professor of Botany to the Royal College of Surgeons in Ireland, Member of the Royal Zoological, Geological and Natural History Societies of Dublin, &c.

[Continued from p. 256.]

Genus 18. Tænia.

(Derived from *ταινία, vitta.*)

Gen. Char.—Body long, flat, soft, and composed of a great number of distinct articulations. Head in general larger than the neck, furnished with two pairs of oscula, suckers or discs, and often with a rostellum or prominence in front, which is surrounded or not by one or two circles of recurved hooks;—what Rudolphi terms 'armed.'

The species of this genus have been hitherto found in the bodies of vertebral animals alone, and the alimentary canal is the only part which they are found to inhabit; they usually occur in the small intestines. They are most abundant in birds, next in mammalia, then in fish, and lastly in reptiles. Rudolphi enumerates 146 species in his 'Synopsis,' of which 53 are doubtful.

The term *Tænia* was employed by the ancients, but they necessarily confounded the genus *Bothriocephalus* with the *Tænia*. The digestive apparatus of these animals consists of two straight lateral canals of the same diameter throughout, which commence at the oscula of the head, run backwards parallel to one another, close to the margins of the articulations, and communicate with one another by a transverse branch at the posterior edge of each articulation.

The organs of reproduction are more complicated; we find male and female organs not only in every individual, but in all the larger articulations of the same individual. A small papillary projection is seen near the centre of the margin of each articu-

lation, in which is the orifice of a duct leading to the ovary. The latter organ occupies the middle of each articulation, and consists of a central canal, which is often filled with ova, and of branches proceeding from its sides. In addition, a slender dark-coloured body is seen, which extends from the marginal orifice inwards towards the centre of the articulation, where it ends in a small oval vesicle; this is considered to be the male organ by which the ova, as they pass through the marginal orifices, are impregnated.

The organs of locomotion in the *Tænia* consist of transverse and longitudinal layers of muscular fibres; the latter are not continued from one articulation to another, as in the genus *Bothriocephalus*, in consequence of which the articulations are readily detached, and each joint when separated from the others enjoys some power of motion. No distinct organs of circulation exist in the *Tænia*, and nothing like a distinct nervous system has yet been observed in them.

Rudolphi has arranged the species of this genus in two great divisions: in one the head is armed with a circle of very minute recurved hooks; in the other this part is naked or unarmed. The latter are further subdivided as the head is provided with a rostellum or prominence in front, or as this is absent.

A. Inermes.

a. *Capite simplici, non rostellato.*

1. { *Tænia expansa* ..... } Small intestine of sheep (*Ovis*
   { —— *ovina* (Linn., Turt.) } *Aries*).
2. *Tænia pectinata** ..... { Small intestine of rabbit (*Lepus Cuniculus*).

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* The *Tænia pectinata* is included in Turton's list of British species, and is very well named, as its serrated margins present the appearance of a comb. I have found it in the wild rabbit upwards of 18 inches in length. Its colour before being immersed in spirits of wine is reddish; the head is not small (as Rudolphi describes it), but is larger in proportion than that of the *Tænia lanceolata*, to which it has some general resemblance. The oscula are round and directed forwards; the articulations nearest the head are very short; they gradually increase in length, but all are broader than long; the posterior articulations are very thick and have somewhat a fleshy appearance. The marginal orifices are best seen in the articulations near the head; they are opposite, and a short filament projects from each, which assists in giving the margin the pectinated appearance; in the most posterior articulations the filaments do not project. The ova are exceedingly numerous, globular, and of a white colour; they are so minute as to be scarcely distinguishable with the naked eye.

3.	*Tænia lanceolata*	Small intestine of pochard (*Fuligula ferina*).
4.	*Tænia cucumerina*	Small intestine of dog (*Canis familiaris*).
	—— *cateniformis* (Penn.)	
5.	*Tænia filicollis* * ..	Intestine of three-spined stickleback (*Gasterosteus aculeatus*).
6.	—— *nasuta* †	Intestine of blue titmouse (*Parus cæruleus*).

b. *Rostellatæ; capitis rostello retractili inermi.*

7.	*Tænia sphærophora.*	Small intestine of curlew (*Numenius arquata*).
8.	—— *lævigata*	Small intestine of plover (*Charadrius Hiaticula*).
9.	—— *cyathiformis* .	Small intestine of swift (*Cypselus Apus*).
10.	*Tænia infundibuliformis* ‡	Small intestine of wild duck (*Anas Boschas*). Small intestine of tame duck (*Anas Boschas domest.*). Small intestine of domestic fowl (*Gallus domesticus*). Small intestine of sparrow (*Fringilla domestica*).

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* In the month of July 1839 I found several specimens of the *Tænia filicollis* in the intestines of the *Gasterosteus aculeatus*; they lived for some time in water, and soon discharged an immense number of ova. In one specimen I saw the ova protruded from the marginal pore in a continuous stream and with great force. The ova are very small, white and spherical, but visible to the naked eye.

The oscula of the head are distinct; when the animal is alive and in motion, there is little distinction between the head and neck, and this part is continually altering its shape. The articulations of the body are thinner at their margins than in the centre, which gives this part a fringed appearance. The last articulation terminates in a remarkable conical point.

† Upon one occasion I found eight specimens of the *Tænia nasuta* in the intestinal canal near its termination of the common blue titmouse (*Parus cæruleus*). The longest measured 2 inches in length. In some of the specimens the head appeared to be provided with a rostellum; hence the species should perhaps rather come under the second division in Rudolphi's arrangement. The neck is distinct; the articulations are as described by Rudolphi.

‡ The *Tænia infundibuliformis* from the small intestine of the wild duck (*Anas Boschas*) is about an inch in length; the head has somewhat a different shape when recent from what it has after lying in spirits of wine; it is triangular, the oscula being elongated and giving it somewhat the appearance of a *Bothriocephalus*. The neck is very short; the rostellum cylindrical, as long as the head and neck together, obtuse, and nearly double their thickness at its extremity. The rostellum of several, after lying in spirits of wine, became much contracted.

11. *Tænia setigera* *	Small intestine of swan (*Cygnus Olor*). Small intestine of goose (*Anas Anser*).
12. —— *platycephala.*	Small intestine of redbreast (*Sylvia Rubecula*).
13. —— *angulata* ..	Small intestine of thrush (*Turdus musicus*). Small intestine of blackbird (*Turdus Merula*). Small intestine of fieldfare (*Turdus pilaris*).
14. —— *lævis*	Small intestine of pochard (*Fuligula ferina*). Small intestine of scaup-duck (*Fuligula Marila*). Intestine of tufted duck (*Fuligula cristata*).
15. —— *æquabilis* ..	Small intestine of wild swan (*Cygnus ferus*). Small intestine of widgeon (*Mareca Penelope*).
16. —— *tenuirostris* .	Small intestine of tufted duck (*Fuligula cristata*). Small intestine of goosander (*Mergus Merganser*).
17. —— *Filum*	Small and large intestine of ruff (*Tringa pugnax*).
18. *Tænia elliptica* † —— *cateniformis* (Pennant) ..	Small intestine of cat (*Felis maniculata*).
19. *Tænia gracilis*	Large intestine of wild duck (*Anas Boschas*).
20. —— *pusilla* ? ‡ ..	Small intestine of mouse (*Mus Musculus*).
21. —— *farciminalis* .	Small intestine of starling (*Sturnus vulgaris*).

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* In the specimens of the *Tænia setigera* from the small intestines of the goose (*Anas Anser*) which I have examined, the pyriform rostellum sometimes projected, at others it did not. All the articulations are very short, though Rudolphi describes those in the middle of the body to be infundibuliform.

† The *Tænia elliptica* is common in the small intestines of the domestic cat; they are usually found towards the extremity of the small intestine near the large. On some occasions I have found them so firmly attached to the mucous membrane of the intestine by their oscula that they could not be detached, but separated at the articulations near the head.

‡ This species, which has several of the characters of the *Tænia pusilla*, inhabits the small intestine of the mouse; it is about an inch and a half in length, dark-coloured when first removed from the animal, becoming white after remaining in water. The rostellum is short, the oscula distinct, head oval; anterior articulations very short, the next broader than long, the last oblong; each anterior articulation overlaps that next to it, which gives the joints the appearance of being double and composed of a narrow and a broad portion. The marginal pores are irregularly alternate, and lemnisci projected from many of them.

22. *Tænia stylosa*.... Small intestine of magpie (*Corvus Pica*).

B. Armatæ.

23. *Tænia solium* * .. Small intestine of man (*Homo*).
24. —— *serrata*.... Small intestine of dog (*Canis familiaris*).
25. —— *crassicollis* . Small intestine of cat (*Felis maniculata*).
26. —— *sinuosa*.... Small intestine of duck (*Anas Boschas domest.*).
27. —— *inflata* † .. Small intestine of bald-coot (*Fulica atra*).

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* The *Tænia solium*, which inhabits the small intestines of the human subject, is longer known than any other species of *Tænia*, and has received several distinct names. Thus it is the *Tænia curcurbitina* of Pallas, the *Tænia vulgaris* of Werner, the *Tænia solium* and *Tænia vulgaris* of Pennant and Turton, the *Tænia armata umana* of Brera, *Tænia à long anneaux* of Cuvier, and the *Tænia cucurbitain* of Lamarck. It is peculiar to the human species, but occurs in the intestinal canal of the inabitants only of certain countries. Thus it is the most common species in Great Britain and Ireland, Holland, Germany, the East Indies, Egypt, and part of France; while in Switzerland, Poland and Russia it is rare, and is replaced by the *Bothriocephalus latus*.

The name *solium*, given to this species by Linnæus, is not strictly correct, as more than one is not unfrequently found in the same individual. It varies in length from 12 inches to 30 feet and upwards; the colour is white when the animal is alive, and its tissue is semitransparent, but it becomes opake after lying in spirits of wine. The body varies much in breadth; near the head it is very narrow, often almost filiform; posteriorly it is broad and flat; its thickness varies according as the animal is fully expanded or contracted. The articulations near the head are very short, and appear to be merely transverse rugæ; they increase gradually in length, become square, and eventually much longer than broad.

The head has a somewhat hemispherical shape, flattened anteriorly; the four oscula are orbicular and surround the rostellum, which is short, retractile, and armed with a double row of minute recurved hooks.

The *Tænia solium* inhabits only the small intestines of the human subject, particularly the jejunum and ilium; it is much more common in the adult than in early life, and is more frequently met with in the female than in the male.

† In the month of April 1838 I found a *Tænia* in the small intestine of the bald-coot (*Fulica atra*) which has the characters of the *Tænia inflata*, but I was not able to see whether the rostellum was armed. It is about an inch in length, colour white; the head is large, somewhat obovate; the oscula prominent, round and large; the rostellum is clavate, the neck long; the anterior articulations are very short, and the terminal articulation is rounded and smaller than those next it.

28. *Tænia porosa*?*. . { Small intestine of herring-gull (*Larus argentatus*).

Species dubiæ.

29. *Tænia* †. Small intestine of wild cat (*Felis Catus*).
30. —— ‡ . Small intestine of rat (*Mus decumanus*).
31. —— § . Small intestine of thrush (*Turdus musicus*).
32. —— ‖ . Small intestine of thrush (*Turdus musicus*).

* Upon two occasions I found specimens of *Tænia* which had the characters of the *Tænia porosa*, firmly attached together as if *in coitu*, the lemnisci of one being inserted into the lateral pores of the other. Hence this species cannot be truly hermaphrodite, as the majority of *Tæniæ* are believed to be.

† In the month of March 1837 I found a single specimen of a *Tænia* in the duodenum of a wild cat (*Felis Catus*) taken in the north of Ireland, which appears to be undescribed. The neck is long; the body dark-coloured when first removed from the animal; the four oscula appeared to the naked eye like four circular spots; the disc of cilia was prominent and white. It most nearly resembled the *Tænia crassicollis*, which is common in the domestic cat, but it differed in several respects from it.

‡ Upon several occasions I have found in the small intestines of the rat (*Mus decumanus*) a species of *Tænia* which differs from those described by Rudolphi as occurring in this animal, and comes nearest the description of a species mentioned by Creplin under the name *Tænia muris ratti*. It belongs to the division '*Inermes*' in Rudolphi's arrangement, and to the subdivision '*Rostellatæ*.' The length is from three to four and a half inches; colour white; body filiform anteriorly; head small, subglobose; in some apparently not separated from the body by any narrower portion or neck, in others this part is seen and is very short. Rostellum unarmed, cylindrical and very short; oscula round and slightly prominent; anterior articulations indistinct, those next exceedingly short, almost linear, and increasing gradually in length, their angles acute; marginal orifices not conspicuous.

§ Upon one occasion I met with several specimens of an undescribed species of *Tænia* in the small intestine near the gizzard of a thrush (*Turdus musicus*). It belongs to the division '*Armatæ*' in Rudolphi's arrangement: the length is about 2 inches; the head small, and with the rostellum has a triangular shape; the oscula are large and conspicuous; the rostellum very short, cylindrical, thick, and armed with minute spines. The body anteriorly is as fine as a thread, and is but little broader posteriorly; the anterior articulations are short; the next longer than broad, somewhat funnel-shaped; the most posterior are broader than long, and rather elliptical than infundibuliform.

‖ This species of *Tænia* occurred in the small intestine near the large of the thrush, and differs in several respects from the preceding; it belongs however to the same division in Rudolphi's arrange-

33. *Tænia* *. Small intestine of domestic fowl (*Gallus domesticus*).
34. —— .. Small intestine of grous (*Tetrao Scoticus*).
35. —— .. Small intestine of oyster-catcher (*Hæmatopus Ostralegus*).
36. —— .. Small intestine of curlew (*Numenius arquata*).
37. —— .. Small intestine of godwit (*Limosa rufa*).
38. —— .. Small intestine of snipe (*Scolopax Gallinago*).
39. —— .. Small intestine of corn-crake (*Crex pratensis*).
40. —— .. Small intestine of tame swan (*Cygnus Olor*).
41. —— .. Small intestine of shieldrake (*Tadorna Bellonii*).
42. —— †. Small and large intestine of pochard (*Fuligula ferina*).
43. —— .. Small intestine of red-breasted merganser (*Mergus Serrator*).
44. —— .. Small intestine of crested grebe (*Podiceps cristatus*).
45. —— .. Small intestine of red-necked grebe (*Podiceps rubricollis*).
46. —— .. Small intestine of northern diver (*Colymbus glacialis*).
47. —— .. Small intestine of razor-bill (*Alca Torda*).
48. —— .. Small intestine of roseate tern (*Sterna Dougallii*).
49. —— .. Small intestine of gull (*Larus Canus*).
50. —— .. Small intestine of kittiwake (*Larus tridactylus*).
51. —— .. Intestine of loach (*Cobitis barbatula*).

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ment. Their length varies from one line to an inch and a half; the head is large and distinct; the four oscula are also distinct; the rostellum is very short, thick and clavate, armed with distinct spines. The larger specimens are provided with a neck, which is not seen in the smaller. The articulations next the neck are merely transverse rugæ, and about the same width as the head; posteriorly they increase in length, but still their transverse diameter always exceeds the antero-posterior; the terminal articulation is short.

* Upon one occasion I found this undescribed species of *Tænia* in such numbers in the duodenum of a chicken only three weeks old, that this part of the intestinal tube was completely blocked up and obstructed by them,—some projected even into the gizzard.

† In the month of January 1839 I found an immense number of *Tæniæ* in the small intestine of the pochard (*Fuligula ferina*), many of which were attached to the mucous membrane: they belong to the division '*Inermes*' and to the subdivision '*Rostellatæ*.' The head is small, subhemispherical; rostellum pyriform, about half the length of the head; oscula large and deep. The anterior articulations vary in shape, sometimes being irregularly oval, the long diameter transversely; the succeeding articulations are exceedingly short, resembling rather transverse rugæ, and those near the posterior extremity are also very short.

XXXIX.—*On the Evidence of the former Existence of Struthious Birds distinct from the Dodo in the islands near Mauritius.* By H. E. Strickland, Esq., M.A. *

It is well known that Leguat, a French Protestant refugee, who for more than two years (from 1691 to 1693) resided in the island of Rodriguez, near Mauritius, described a bird under the name of *le Solitaire*, which Latham considered to be allied to, but distinct from, the Dodo, and which Gmelin denominated *Didus solitarius*. Later authors have supposed Leguat's bird to be either altogether fictitious, or to be founded on an imperfect description of the true Dodo, *Didus ineptus*, Linn., of whose former existence in the island of Mauritius there is now no dispute. Considering, however, that Leguat was a man of education, and that the rest of his narrative bears intrinsic proofs of veracity, there is no reason to doubt the general accuracy of his description of the *Solitaire*; and if this be admitted, it follows that his bird was distinct, generically as well as specifically, from the Dodo.

The *Solitaire*, as described and figured by Leguat, must have differed from the Dodo in the following respects:—

1. The beak is stated to resemble that of a turkey, except in being rather more curved. Leguat's figure corresponds with this description, and exhibits a moderate-sized gallinaceous-formed beak, totally unlike that which we know the Dodo to have possessed.

2. The *Solitaire* is said to have had hardly any tail, whereas the Dodo was depicted with an arched tail, like that of the ostrich.

3. The *Solitaire* is said to be longer in the leg ("plus haut montée") than a turkey, while the Dodo was a very short-legged bird, as shown by the specimens in the British and Oxford Museums.

4. The *Solitaire* carried its neck erect, and this member was said to be longer in proportion than that of a turkey. But the Dodo is depicted with a short, thick and curved neck, corresponding with the massive proportions of its head.

5. Though unable to fly, the wings of the *Solitaire* appear to have been more developed than in the Dodo, as they were enlarged at the end into a knob the size of a musket-ball, with which the bird attacked its enemies.

6. The female *Solitaire* is stated to have a kind of band (probably composed of feathers) at the upper part of the beak, resembling a widow's cap; but in the Dodo the whole face was naked.

It seems then sufficiently evident, that as late as the year 1693 the island of Rodriguez was inhabited by a large species of bird distinct from the Dodo of Mauritius, and now exterminated. This bird was unable to fly; and Leguat, who gives a minute description of its habits, mentions the remarkable circumstance that it lays one egg on a heap of palm-leaves a foot and a half high, a character which possibly indicates an affinity to *Talegalla* and the *Megapodiinæ* of Australia.

* From the Proceedings of the Zoological Society, April 23, 1844.

The *Solitaire* of Rodriguez seems not to have been mentioned by any other author than Leguat, and we may presume that the species was exterminated within a few years after his visit.

There is evidence however that other apterous birds of this anomalous class formerly existed in the adjacent island of Bourbon. In the library of the Zoological Society is a manuscript presented by that active naturalist the late C. Telfair, Esq., who during his residence in Mauritius collected many valuable scientific and historical documents. This MS. is entitled 'Journal et Relation des Voyages faits par le S^{r} D. B. aux îles Dauphine ou Madagascar et de Bourbon ou Mascarenne.' 1669. The author, who seems to have been a very intelligent observer, speaking of the birds of the island of Bourbon, has the following passage:—

"Oiseaux de terre et leurs noms.

"*Solitaires*: ces oiseaux sont nommés ainsi, parce qu'ils vont toujours seuls. Ils sont gros comme une grosse Oye, et ont le plumage blanc, noir à l'extrémité des ailes et de la queue. À la queue il y a des plumes approchantes de celles d'Autruche, ils ont le col long, et le bec fait comme celui des bécasses, mais plus gros, les jambes et pieds comme poulets d'Inde. Cet oiseau se prend à la course, ne volant que bien peu.

"*Oiseaux bleus*, gros comme les *Solitaires*, ont le plumage tout bleu, le bec et les pieds rouges, faits comme pieds de poules, ils ne volent point, mais ils courent extrêmement vite, tellement qu'un chien a peine d'en attraper à la course; ils sont très bons."

The author then proceeds to describe the wild pigeons and other birds of Bourbon.

It appears then that about the year 1670 the island of Bourbon was inhabited by two species of Struthious birds, one of which was called *Solitaire*, and the other *Oiseau bleu*. The *Solitaire* of Bourbon seems however to have been distinct from, though probably allied to, the bird of that name in Rodriguez. Its plumage is stated to have been white, with the wings and tail terminated with black, whereas Leguat describes the Rodriguez bird as greyish and brown. The Bourbon species further differed in having a tail similar to that of an ostrich, and in the beak being lengthened, "like that of a woodcock, but stouter," in which respect it must have resembled the Apteryx of New Zealand. The phrase "ne volant que bien peu" would seem to imply that the bird possessed some powers of flight, though possibly it may only mean that when hard pressed the bird aided its progress by flapping the wings, or by springing into the air for a short distance.

The *Oiseaux bleus* seem to have been a distinct species both from the Dodo and from the Solitaires of Bourbon and of Rodriguez, and to have been wholly unable to fly, but possessed, like the Apteryx, of great cursorial powers.

We are then justified in believing, from the relations of authors apparently deserving of credit, that the three contiguous islands of Mauritius, Bourbon and Rodriguez were formerly inhabited by at least four distinct species of birds, deprived, or nearly so, of the power of flight, and more nearly allied in structure to the Apteryx of New Zealand than to any other existing genus of birds. And if the ac-

count given by Cauche of a tridactylous and apterous bird in Mauritius, called *Oiseau de Nazarette*, be correct, we must believe in the former existence of a fifth species of the same anomalous family.

Nor need we be surprised at the supposition that the species allied to the Dodo may have been thus numerous, when we recollect that Prof. Owen has already shown that no less than five species of that ornithic wonder, the Dinornis, inhabited New Zealand at a very recent date, and were doubtless contemporaries of the still surviving Apteryx. Still less should we wonder at the speedy extinction of these birds after man took possession of the Mauritian archipelago. Confined to very small islands, unable to escape from their enemies by flight, and highly esteemed for food, they soon experienced the same fate as that of the Dinornis, a fate which will shortly overtake the unprotected Apteryx*.

Having thus shown that there is good historical evidence of the former existence of several Struthious or *Didiform* birds in the Mauritian group of islands, we may inquire whether any actual remains of these deceased species are still attainable. On this point I must be content rather to excite inquiry than to supply information. Of the Dodo, as is well known, we possess an entire head, and the feet of two individuals; but of the other birds above referred to, no relics have yet been identified. M. Quoy, however, assured M. de Blainville that the bones in the Paris Museum which Cuvier supposed to belong to the Dodo, were brought, not from Mauritius, but from Rodriguez; and it is therefore probable, as supposed by M. de Blainville, that they may have belonged to the *Solitaire* of Leguat. There are, too, certain bones from Rodriguez presented by Mr. Telfair to this Society (Zool. Proceedings, Part I. p. 31); and in the Andersonian Museum at Glasgow there are also some so-called "Dodo's bones from Mauritius." All these materials should be submitted to careful examination; and we may feel confident that if Prof. Owen, who has so skilfully demonstrated the affinities of the Dinornis from a few fragments of the skeleton, were to take these materials in hand, he would soon deduce some valuable results, whether positive or negative, from the investigation.

Much light also might probably be thrown on the subject if naturalists residing in Mauritius, Bourbon and Rodriguez would endeavour to obtain further evidence. The alluvia of streams, the soil on the floors of caverns, and even the ancient mounds of rubbish near towns and villages, should be carefully searched, and every fragment of bone preserved. We may hope that the success which has attended such researches in New Zealand will stimulate the naturalists of Mauritius to similar efforts, and that the *Solitaires* and *Oiseaux bleus* will ere long, like the Dodo and the Dinornis, take their just rank in our systems of ornithology.

* It is probable that in 1693, when Leguat visited Mauritius, the Dodo had been extinct a considerable time. He makes no mention of any such bird, but remarks "L'île était autrefois toute remplie d'Oyes et de Canards sauvages, de Poules d'eau, de Gelinottes, de Tortues de mer et de terre; *mais tout cela est devenu fort rare*;" showing that at that period, when the Dutch had occupied Mauritius for nearly a century, civilization had made great inroads on the fauna of the island.

BRITISH MUSEUM
NATURAL HISTORY
Z D

Dickieia ulvoides.

Stereum hydrophorum.

Berkeley del. J.D.C. Sowerby, sculp.

XL.—*Description of a new Fungus from British Guiana.*

By the Rev. M. J. Berkeley, M.A., F.L.S.

[With a Plate.]

The singular and beautiful species of which I have now the pleasure of giving a description and figure was kindly transmitted to me by Mr. Bentham. It was gathered in British Guiana by Mr. Schomburgk, who was struck with the curious circumstance that in the driest weather it always contains some water, and in the rainy season is quite full. This is the more remarkable as the specimens when immersed in water are soon saturated with moisture, and when placed in paper become dry in a very short time. How so bibulous a substance can retain any liquid is very difficult to understand, for there is no dense stratum of cells to prevent its percolation, and it is scarcely probable that it can secrete any. I am inclined however to think that the water is prevented from coming into immediate contact with the fungus by the air which is imprisoned by the velvety down which clothes the upper surface; but it is impossible to speak confidently without observing the species in its natural habitat, and unfortunately nothing beyond the simple fact was mentioned by Mr. Schomburgk. There is but one species to which it bears any strong resemblance, viz. *Thelephora infundibuliformis*, Hook., in Kunth, 'Syn.' Unfortunately no specimen remains in Sir W. J. Hooker's herbarium, but the characters "pallide fusca, squamoso-hirsuta," do not accord with our plant. I have therefore given it a specific name denoting the peculiar property indicated by its discoverer.

Stereum hydrophorum, Berk. Pileo infundibuliformi, juniori integro, adulto fisso-crenato zonato ferrugineo velutino, pilis hic illic fasciculatis; stipite brevi concolore subtiliter velutino, hymenio lævi pallidiore.

Hab. On decayed wood, British Guiana.

Pileus $4\frac{1}{2}$ inches broad, 3 inches deep, thin, papyraceo-coriaceous, infundibuliform, at first quite entire, at length crenate and split, but scarcely lobed, ferruginous, repeatedly zoned, especially towards the margin, clothed with short velvety down, which in parts is thicker and fasciculate.

Stem 1 inch high, 2 lines thick, incrassated above, attached by a small disc, minutely velvety, of the same colour as the pileus, solid.

Hymenium smooth, even, paler than the pileus.

In the younger specimen the hymenium is finely zoned as well as the pileus, and in parts there is a slight velvety appearance, which arises either from the hymenium not being completely formed, or from the plant having accidentally been inverted.

Plate IX. fig. 2. *Stereum hydrophorum*, nat. size.

XLI.—*On a new Genus of* Diatomaceæ. By the Rev. M. J. Berkeley and J. Ralfs, Esq.

[With a Plate.]

The Aberdeenshire coast, though far from rich in the higher order of Algæ, has rewarded the researches of Dr. Dickie with one or two species of great interest. In those which are more or less intimately related to *Schizonema*, on the contrary, several species have occurred no less remarkable for their large size and unusual form than for their beauty. One of these is so anomalous, having a central thread containing frustules, as in *Schizonema*, surrounded by a highly developed cellular coat, and at the tips extending beyond it, that it has been thought desirable to wait for maturer observation, should another season prove favourable, by a renewed examination of the structure, rather than to publish it as a pendant to the present short notice.

The species which we have now the pleasure of dedicating to its discoverer, Dr. Dickie, is remarkable for its flat ulva-like frond and its pale purplish tint, and cannot be associated with any known genus. Its habit at once removes it from *Schizonema*, whether taken in a more confined sense and limited to the species with a compound frond, or comprising *Micromega* and such species as *S. Dillwynii*: from *Encyonema*, of which *Monema prostratum* is a synonym, by its straight, not cymbiform frustules: from *Homœocladia* by its short, not elongated frustules, as also by its habit; and from *Berkeleya* again by habit, and by the want of a gelatinous base. Whether Kützing has anything more nearly allied to it will be seen on the publication of his great work on *Diatomaceæ*, especially as we have communicated this curious production to him under the name which we are now about to record.

Dickieia, *Berk. and Ralfs.*

Frons subgelatinosa, tenera plana deorsum attenuata, undulata, apice obtuso. Frustula oblonga sparsa simplicia vel binata angulis puncto orbiculari notatis. Alga marina vernalis pallide purpureo-alba. Nomen dedimus in honorem Doct. G. Dickie Algarum peritissimi scrutatoris.

Dickieia ulvoides, Berk. and Ralfs.

Hab. In shallow pools between high and low water mark with *Schizonema comoides* and other allied forms. April 20, 1844. Aberdeen, Dr. Dickie.

Frond 1—1½ inch high, resembling young specimens of *Porphyra vulgaris*, but of a very pale purplish white hue, a gelatinous consistence, and entirely free from any cellular tissue; lanceolate, much attenuated below, rather obtuse above, and sometimes,

though rarely, obovate, very tender and delicate, easily torn, and sometimes perforated with a few roundish apertures, undulated, but not crisped. Frustules single or binate, scattered in the gelatinous substance of the frond without order, oblong, variable in breadth, with the extremities rounded; when fresh marked, according to Dr. Dickie, at the four angles with a round colourless spot. When dry the colouring matter contracts on either side and the pale spots are not visible. There is no trace of any striæ. The lateral view is very narrow, simply oblong, with the ends rounded. The colour of the plant when dry is a pale green. The frustules do not appear to be decidedly siliceous, but they have the prismatic form of really siliceous frustules. It appears to be quite a spring species. Every specimen had vanished by the end of the month.

Plate IX. fig. 1. *a*, *Dickieia ulvoides*, nat. size, in different stages of growth; *b*, frustules sketched when fresh by Dr. Dickie, highly magnified; *c*, a frustule observed when dry; *d*, lateral view of the same; *e*, a portion of the frond, less highly magnified, showing the simple and binate frustules.

XLII.—*Descriptions of* Pterochilus, *a new genus of Nudibranchiate Mollusca, and two new species of* Doris. By Joshua Alder and Albany Hancock, Esqrs.

Gen. Pterochilus.

Body oblong, nearly linear, tapering behind. *Head* anterior, terminal, having a flat expanded lobe on each side, forming a kind of veil above the mouth. *Jaws* corneous. *Tentacula* two, linear, dorsal, with the eyes behind them. *Branchiæ* papillary, elongated, arranged down the sides of the back. *Anus* on the right side behind the generative organs.

This genus is allied to *Eolis* and *Calliopæa*, but differs from both in having the head strongly lobed at the sides. It may also be distinguished from the former by having only two tentacula, and from the latter by the gastric system, which in *Calliopæa* has two longitudinal vessels down the back, while in *Pterochilus* there is only one, which is central and undulating. The jaws are triangular horny plates, capped at the anterior angles as in *Proctonotus*. The tongue is narrow, strap-shaped and denticulated. The auditory capsule has a single otolite.

P. pulcher.—*Body* nearly linear, pale flesh-coloured, spotted with opake white. *Head* furnished with a flat, rounded lobe on each side of the mouth, forming a kind of veil. *Tentacula* short, cylindrical, set much apart on the head. *Eyes* considerably behind them. *Branchiæ* five or six on each side of the back, in a single series, the first two nearly opposite each other; the rest

alternating, rather large, elliptical, bright orange-red, enveloped in transparent sheaths, spotted with opake white. The gastric vessel may be seen through the transparent skin of a pale orange colour, running in an undulating line down the back and sending off alternate branches to the papillæ. *Foot* linear, transparent, flesh-coloured, rounded in front and not produced at the sides. *Tail* rather short and blunt. Length $\frac{3}{10}$ths of an inch.

Found on a stone at low water mark on the west side of Rothesay Bay, Isle of Bute.

Doris flammea.—*Body* ovate, rounded at both ends, of a bright orange-scarlet; occasionally blotched with purple. *Cloak* covered with short, obtuse, spiculose tubercles, of unequal sizes, smallest towards the edge, which is thin and extending beyond the foot. *Dorsal tentacula* rather large, tapering, orange, with ten or eleven scarlet laminæ and imperfect intermediate ones; the orifices strongly tuberculated at the edges. *Branchiæ* composed of nine scarlet plumes, rather paler than the body, three or four times pinnate, retractile within a single cavity. *Head* small, the veil lobed and slightly produced at the sides. *Foot* deep scarlet, rounded behind. Under side of the cloak granulated and spotted with opake yellow. Length nearly an inch, breadth one half as much.

Dredged up on *Pecten opercularis* in shallow water, Rothesay Bay.

This species comes very near to *Doris tuberculata*, but has the tubercles and branchial plumes rather smaller, and is of a different colour. Of two specimens found, the largest was of a uniform scarlet; the other scarlet, with a few blotches of purple on the back, and a pale purple or lilac margin to the branchial plumes.

Doris mera.—*Body* white, rather broad and elevated on the back. *Cloak* covered with moderately sized, unequal, round tubercles; spiculose, the spiculæ radiating from their base. *Tentacula* without sheaths, pale yellow, much inclined backwards and thinly lamellated, with four or five broad plates and imperfect intermediate ones. *Branchiæ* of 13 tripinnate, colourless plumes, set closely round the vent and forming a beautiful cup, retractile within a common orifice. *Head* small, square, with the anterior angles a little produced. *Foot* transparent yellowish white, rather straight, not extending beyond the cloak behind, the front transversely slit and the upper part notched in the centre. Length $\frac{3}{8}$ths of an inch.

Found under a stone at low water mark, Cullercoats.

The nearest allies to this species are *D. aspera* and *D. repanda*, between which it holds an intermediate place, but is perfectly distinct from either of them. From *D. aspera* it differs in having the tubercles smaller and more numerous, and in the different form of the head, tentacula, and branchial plumes. On the con-

trary the tubercles are much larger than those of *D. repanda*, and it wants the row of opake spots down the sides of the cloak which distinguish that species. The branchial plumes are also more numerous and the tentacula differently formed.

XLIII.—*On the species of* Chalcidites *inhabiting the Arctic Region.*

By Francis Walker, Esq., F.L.S.

Having in a previous communication mentioned the *Chalcidites* of the North American region, I will now proceed to notice the species discovered within the Arctic Circle. Several of them also inhabit England, and among these, as may be supposed, are the *Chalcidites*, which with us live through the winter or appear early in the spring.

Eurytoma.

E. verticillata, *Fabr.* ? = E. appendigaster *Swederus, Zetterstedt.*

Isosoma.

I. longulum, *Ent. Mag.* i. 14 = Eurytoma guttula, *Zett.*
I ? (Eurytoma, *Zett.*) minuta, *Zett.*

Callimome.

C. Bedeguaris, *Linn.* ?
C. viridissimus, *Zett.* = C. affinis, *Ent. Mag.* i. 133.
C. Tipulariarum, *Zett.*

Zetterstedt describes some other species as varieties of *C. viridissimus*, but remarks that they are probably distinct species.

C. chloromerus, *Ent. Mag.* i. 128. In the summer at Alten, Finmark.
C. minutus, *Ent. Mag.* i. 137. Alten.
C. posticus, *Ent. Mag.* i. 137. Hammerfest, Finmark.
Ormyrus punctiger, *Ent. Mag.* i. 140. Alten.

Euneura.

Genus novum *Corynæ* affinis. *Fem.* Corpus convexum, robustum, subcylindricum: antennæ 13-articulatæ, subclavatæ, thorace non longiores: parapsides scuto fere in unum confusæ: petiolus brevissimus: abdominis segmentum 2^{um} 1^{o} plus duplo brevius; 3^{um} 2^{o} duplo longius; 4^{um} 3^{o} paullo longius; 5^{um} 4^{o} paullo longius; 6^{um} et 7^{u} brevissima: ulna brevis, crassa, humeri triente non longior; radius ulna duplo longior; cubitus ulna longior.

Euneura Augarus, fem. *Viridis, antennis nigris, pedibus fulvis, femoribus viridibus, mesotarsis et metatarsis flavis, alis limpidis.* (Corp. long. lin. 1$\frac{1}{4}$; alar. lin. 2.)

Body convex, robust, dark green: head and thorax finely squameous: head a little broader than the thorax: eyes oval, prominent, of moderate size: ocelli near together on the vertex; the middle one

a little in advance : antennæ black, subclavate, not longer than the thorax ; first joint long, slender, fulvous, black at the tip ; second cyathiform ; third and fourth very minute ; fifth and following joints to the tenth successively yet slightly shorter and broader ; club fusiform, more than twice the length of the tenth joint : thorax elliptical, broader before than behind : prothorax transverse, very short, narrow in front : scutum of the mesothorax broad ; sutures of the parapsides very indistinct, so that the latter seem almost to form one segment with the scutum ; axillæ large, triangular, not conniving ; scutellum rhomboidal, prominent, much more convex than the scutum, having a very indistinct transverse suture near its hind border : metathorax transverse, very short : propodeon large, obconic, declining : podeon stout, very short : abdomen elliptical, shining, very minutely squameous, almost smooth, narrow, but hardly longer than the thorax ; metapodeon short, conical, decumbent in front, shorter than one-fourth of the length of the abdomen ; octoon much less than half the length of the metapodeon ; ennaton at least twice the length of the octoon ; decaton a little longer than the ennaton ; protelum a little longer than the decaton ; paratelum and telum very short : oviduct concealed : legs fulvous ; coxæ and thighs green ; middle and hind tarsi yellow, their tips fuscous : wings of moderate size, very slightly tinged with fuscous ; nervures piceous ; humerus much less than half the length of the wing ; ulna short, thick, not more than one-third of the length of the humerus ; radius twice the length of the ulna ; cubitus longer than the ulna ; stigma small, emitting a very distinct branch.

Alten.

Zetterstedt in his ‘ Insecta Lapponica ’ describes the following twenty-one species of *Chalcidites* as belonging to *Pteromalus* ; many of them, as it will be observed, have been separated from that genus.

1. quadrum, *Fabr.* (Cheiropachys) ; 2. hirtipes (Trigonoderus ?) ; 3. tarsatus ; 4. curtus ; 5. puparum, *Linn.* ; 6. violaceus ; 7. petiolatus (Asaphes vulgaris ?) ; 8. parvulus (Pteromalus Pyttalus ?) ; 9. gracilicornis ; 10. crassicornis ; 11. subvirescens (Pteromalus Rhinthon ?) ; 12. albipennis (Iera ?) ; 13. mandibularis ; 14. socius ; 15. tibiellus ; 16. palpigerus (Pachylarthrus patellanus) ; 17. rotundiventris (Pteromalus domesticus ?) ; 18. apicalis ; 19. brevicornis ; 20. pubicornis (Cyrtogaster vulgaris ?) ; 21. petioliventris.

Cyrtogaster vulgaris, *Ent. Mag.* i. 382. Alten.
——— rufipes, *Ent. Mag.* i. 383. Alten.
Lamprotatus maculatus, *Ent. Mag.* i. 459. Alten.

Lamprotatus Phlegias, mas. *Viridis, antennis piceis, pedibus fuscis, tarsis fulvis, alis limpidis.* (Corp. long. lin. $1\frac{1}{4}$; alar. lin. 2.)

Body narrow, green : head and thorax convex, finely squameous : head a little broader than the thorax : antennæ filiform, piceous, a little longer than the thorax ; first joint long, slender, green ; second

cyathiform ; third and fourth very minute ; fifth and following joints to the tenth long, linear, successively decreasing in length ; club fusiform, more than twice the length of the tenth joint : thorax fusiform : prothorax transverse, narrower and rounded in front ; its breadth much more than twice its length : scutum of the mesothorax very long ; sutures of the parapsides distinct ; axillæ large, triangular, approaching near to each other ; scutellum rhomboidal, having a transverse suture near its hind border : metathorax transverse, very short : propodeon large, obconic, slightly decumbent : podeon very short : abdomen nearly linear, flat, smooth, shining, narrower and a little shorter than the thorax ; metapodeon large ; octoon, ennaton, decaton and protelum of moderate size ; paratelum and telum very short : legs fuscous ; coxæ green ; knees and tarsi fulvous, the latter darker towards their tips : wings limpid ; nervures fuscous ; humerus much less than half the length of the wing ; ulna not more than half the length of the humerus ; radius very much longer than the ulna ; cubitus much shorter than the ulna ; stigma of moderate size, emitting a short branch.

Alten.

Lamprotatus Mazœus, fem. *Æneus, antennis piceis, pedibus fulvis, alis limpidis.* (Corp. long. lin. $1\frac{1}{4}$; alar. lin. $2\frac{1}{2}$.)

Body convex, æneous : head and thorax finely squameous ; head a little broader than the thorax : antennæ slender, subclavate, piceous, a little longer than the thorax ; first and second joints green ; first long, slender ; second cyathiform ; third and fourth very minute ; fifth and following joints long, linear, successively decreasing in length and very slightly increasing in breadth ; club fusiform, twice the length of the tenth joint : thorax elliptical : prothorax transverse, narrower in front ; its breadth much more than twice its length : scutum of the mesothorax broad ; sutures of the parapsides distinct, approaching each other ; axillæ large, triangular ; scutellum rhomboidal, having a transverse suture near its hind border ? : metathorax transverse, very short : propodeon large, obconic, decumbent : podeon short, stout : abdomen oval, much shorter than the thorax ; metapodeon occupying nearly one-third of the dorsum ; octoon about half the length of the metapodeon ; ennaton much longer than the octoon ; decaton much shorter than the ennaton ; protelum as long as the decaton ; paratelum and telum very short : legs fulvous ; coxæ green : wings limpid, ample ; nervures fuscous ; humerus much shorter than half the length of the wing ; ulna hardly more than half the length of the humerus ; radius very much longer than the ulna ; cubitus much shorter than the ulna ; stigma of moderate size, emitting a short branch.

Alten.

Lamprotatus Brises, fem. *Æneo-viridis, abdomine cyaneo, antennis nigris, pedibus flavis, femoribus basi viridibus, alis limpidis.* (Corp. long. lin. $\frac{5}{4}$—1 ; alar. lin. $1\frac{1}{4}$—$1\frac{1}{2}$.)

Body convex : head and thorax æneous-green, finely squameous :

head a little broader than the thorax: antennæ black, subclavate, as long as the thorax; first joint long, slender, green; second cyathiform; third and fourth very minute; 5th and following joints to the tenth successively shorter and broader; club fusiform, broader than the tenth joint and more than twice its length: thorax fusiform: prothorax transverse, rounded in front; its breadth more than twice its length: scutum of the mesothorax rather long; sutures of the parapsides very distinct; axillæ large, triangular, approaching near to each other; scutellum rhomboidal, having a transverse suture near its hind border: metathorax transverse, very short: propodeon large, obconic, slightly declining: podeon stout, short, not more than half the length of the propodeon: abdomen oval, blue, smooth, shining, keeled beneath, and thence forming an abrupt angle to the tip, hardly more than half the length of the thorax; metapodeon occupying about one-third of the dorsum, slightly concave towards the base; octoon not half the length of the metapodeon; ennaton shorter than the octoon; decaton still shorter; protelum as long as the decaton; paratelum and telum very short: legs yellow; coxæ green; thighs green towards the base; tips of the tarsi fuscous: wings limpid; nervures fuscous; humerus much less than half the length of the wing; ulna more than half the length of the humerus; radius much longer than the ulna; cubitus much shorter than the ulna; of moderate size, emitting a short branch.

Alten.

Lamprotatus Cleta, mas. *Viridis, abdomine æneo, antennis fuscis, pedibus flavis, mesopedum tarsis fuscis, alis albis.* (Corp. long. lin. $\frac{3}{4}$; alar. lin. $1\frac{1}{4}$.)

Male.—Body convex, rather slender: head and thorax green, finely squameous: head a little broader than the thorax, slightly impressed in front: antennæ fuscous, slender, filiform, a little longer than the thorax; first and second joints green; first long, stout; second cyathiform, piceous; third and following joints to the tenth long, linear, successively decreasing in length; club fusiform, pointed, twice the length of the tenth joint: thorax elliptical: prothorax transverse, rounded in front, much narrower than the mesothorax; its length somewhat less than half its breadth: scutum of the mesothorax rather long; parapsides prominent, their sutures very distinct; axillæ large, triangular, approaching near to each other; scutellum somewhat rhomboidal, very convex: metathorax transverse, very short: propodeon rather large, declining, obconical: podeon stout, very short: abdomen smooth, shining, æneous, flat, nearly linear, tinged with purple, a little shorter and narrower than the thorax; metapodeon occupying less than one-third of the dorsum; octoon, ennaton, decaton and protelum of moderate and nearly equal size; paratelum and telum short: sexual parts long, piceous: legs bright yellow; coxæ green; hind thighs piceous towards the base; tarsi and tips of the tibiæ of the middle legs fuscous: wings white, rather short; nervures fulvous; humerus much less than half the length of the wing; ulna more than half the length of the humerus; radius much longer than

the ulna; cubitus more than half the length of the ulna; stigma of moderate size, emitting no branch.

Female ?—Antennæ piceous, subclavate, not longer than the thorax; first and second joints green; fifth and following joints to the tenth successively shorter and broader; club elliptical, broader than the tenth joint, and more than twice its length: abdomen oval, deeply keeled beneath, much shorter than the thorax; metapodeon occupying less than one-fourth of the dorsum; octoon shorter than the metapodeon; ennaton shorter than the octoon; decaton still shorter; protelum as long as the decaton; paratelum and telum short: legs dark yellow; thighs mostly green; tips of the tarsi fuscous.

Alten.

Lamprotatus Scæa, mas. *Viridis, abdomine æneo-vario, antennis nigris, pedibus flavis fusco-cinctis, alis limpidis.* (Corp. long. lin. 1; alar. lin. $1\frac{3}{4}$.)

Head and thorax convex, finely squameous: head dark bluish green, broader than the thorax: antennæ black, slender, filiform, a little longer than the thorax; first joint long, slender; second cyathiform; third and fourth very short; fifth and following joints to the tenth long, linear, successively decreasing in length; club fusiform, much more than twice the length of the tenth joint: thorax elliptical: prothorax transverse, rounded in front, narrower than the mesothorax; its breadth much more than twice its length: scutum large; parapsides prominent, their sutures very distinct; axillæ large, triangular, approaching near to each other; scutellum rhomboidal, having a transverse suture near its hinder border; metathorax transverse, very short: propodeon obconic, decumbent: podeon stout, very short: abdomen nearly linear, flat, æneous-green, shining, smooth or covered with very minute scales, shorter and narrower than the thorax; metapodeon occupying more than one-third of the dorsum; octoon, ennaton, decaton and protelum of moderate and nearly equal size; paratelum and telum short: sexual parts long, fuscous: legs yellow; coxæ green; thighs piceous, yellow towards their tips; middle tarsi and tips of middle and hind tibiæ fuscous: wings limpid; nervures fuscous; humerus much less than half the length of the wing; ulna more than half the length of the humerus; radius much longer than the ulna; cubitus more than half the length of the ulna; stigma of moderate size, emitting a short branch.

Alten.

Lamprotatus Leucon, fem. *Cyaneo-viridis, antennis nigris, pedibus fulvis, femoribus basi fuscis aut viridibus, tarsis flavis, alis albis.* (Corp. long. lin. $\frac{3}{4}$; alar. lin. $1\frac{1}{4}$.)

Body slender, bluish green: head and thorax convex, finely squameous: head a little broader than the thorax: antennæ black, clavate, slender, as long as the thorax; first joint green, long, slender; second cyathiform; third and fourth very minute; fifth and following joints to the tenth successively shorter and broader; club elliptical, broader than the tenth joint, and more than twice its length: thorax fusiform: prothorax transverse, short, much narrower in front; its

breadth much more than twice its length: scutum of the mesothorax rather long; sutures of the parapsides distinct; axillæ large, triangular; scutellum rhomboidal, having a rim along its hind border: metathorax transverse, very short: propodeon large, obconic, slightly decumbent, having a rim on each side: podeon stout, very short: abdomen elliptical, smooth, shining, concave above, keeled beneath, a little narrower and much shorter than the thorax; segments retracted beneath and hiding the ventral segments; metapodeon occupying much less than one-third of the dorsum; octoon much shorter than the metapodeon; ennaton much shorter than the octoon; decaton and protelum of moderate size, each equal to the ennaton; paratelum and telum short: legs fulvous; coxæ green; thighs fuscous towards the base; tips of middle tibiæ slightly fuscous; middle and hind tarsi yellow, their tips fuscous: wings white, narrow; nervures pale fulvous; humerus much shorter than half the length of the wing; ulna not much more than half the length of the humerus; radius very much longer than the ulna; cubitus shorter than the ulna; stigma very small, emitting a short branch.

Var. β. Thighs mostly green.

Alten.

Lamprotatus Lesches, mas. *Viridis, abdomine æneo, antennis piceis, pedibus flavis, alis limpidis.* Fem.? *Antennis nigris, abdomine cyaneo-viridi, pedibus fulvis, femoribus viridibus.* (Corp. long. lin. 1—1¼; alar. lin. 2—2½.)

Male.—Head and thorax green, convex, finely squameous: head a little broader than the thorax: antennæ piceous, filiform; first joint long, stout, fulvous toward the base; second cyathiform; third and fourth very minute; fifth and following long, linear: thorax elliptical: prothorax transverse, rounded in front, much narrower than the mesothorax; its breadth not more than twice its length: scutum of the mesothorax broad; parapsides prominent, their sutures very distinct; axillæ large, triangular, approaching each other; scutellum rhomboidal, having a transverse suture near the hind border: metathorax transverse, very short: propodeon large, obconic, slightly decumbent: podeon short, stout: abdomen æneous, flat, nearly linear, smooth, shining, shorter and narrower than the thorax; metapodeon concave, occupying about one-third of the dorsum; octoon, ennaton, decaton and protelum of moderate size; paratelum and telum very short: legs yellow; coxæ green; tips of tarsi fuscous: wings limpid, ample; nervures fuscous; humerus much less than half the length of the wing; ulna not more than half the length of the humerus; radius nearly twice the length of the ulna; cubitus much shorter than the ulna; stigma large, emitting a short branch.

Female?—Antennæ black, slender, subclavate, as long as the thorax; first joint long, slender, green; second cyathiform; third and fourth very minute; fifth and following joints long, linear, successively decreasing in length, and slightly increasing in breadth until the tenth; club fusiform, twice the length of the tenth joint: abdomen oval, convex, bluish green, keeled beneath, much shorter

than the thorax; metapodeon slightly concave, occupying more than one-third of the dorsum; octoon not half the length of the metapodeon; ennaton shorter than the octoon; decaton still shorter; protelum short; paratelum and telum very short: legs fulvous; thighs green, their tips fulvous; tips of the tarsi fuscous.

Alten.

Lamprotatus Icelos, mas. *Viridis, abdomine æneo, antennis piceis, pedibus fulvis, femoribus viridibus, mesotibiis apice et mesotarsis fuscis, alis limpidis.* Fem.? *Antennis nigris, abdomine viridi, femoribus fulvis basi fuscis.* (Corp. long. lin. 1; alar. lin. 2.)

Male.—Head and thorax green, convex, finely squameous: head a little broader than the thorax: antennæ piceous, filiform, as long as the thorax; first joint long, stout; second cyathiform; third and fourth very minute; fifth and following joints long, linear, successively decreasing in length; club fusiform, twice the length of the tenth joint: thorax elliptical: prothorax transverse, rounded in front, its breadth much more than twice its length: scutum of the mesothorax large; sutures of the parapsides very distinct; axillæ large, triangular, approaching each other; scutellum rhomboidal, having a transverse suture near its hind border: metathorax transverse, very short: propodeon large, obconic, decumbent: podeon stout, short: abdomen æneous, oval, flat, smooth, shining, shorter than the thorax; metapodeon large; octoon, ennaton, decaton and protelum of moderate size; paratelum and telum very short: legs fulvous; coxæ and thighs green; tips of the tarsi fuscous; tarsi and tips of the tibiæ of the middle legs piceous: wings limpid; nervures piceous; humerus much less than half the length of the wing; ulna rather more than half the length of the humerus; radius much longer than the ulna; cubitus much shorter than the ulna; stigma large, emitting a short branch.

Female?—Antennæ black, clavate, as long as the thorax; first joint long, slender, green; second cyathiform; third and fourth very minute; fifth and following joints to the tenth successively shorter and broader; club elliptical, broader than the tenth joint, and more than twice its length: abdomen oval, green, convex, keeled beneath, much shorter than the thorax; metapodeon large; octoon and following segments short: legs fulvous; coxæ green; thighs fuscous towards the base; tarsi yellow, their tips fuscous.

Alten.

Seladerma Mazares, mas et fem. *Viride, cupreo varium, antennis nigris, pedibus fulvis, femoribus basi viridibus, alis limpidis.* (Corp. long. lin. $1\frac{3}{4}$—2; alar. lin. $2\frac{3}{4}$—3.)

Male.—Body slender: head and thorax convex, bright green, finely squameous: head large, broader than the thorax: antennæ black, stout, filiform, longer than the thorax; first joint long, subclavate; second cyathiform; third and fourth very minute; fifth and following joints to the tenth long, linear, successively decreasing in length: thorax fusiform: prothorax transverse, narrower in front;

its breadth about twice its length: scutum of the mesothorax very long; sutures of the parapsides very distinct, approaching each other; axillæ large, triangular, not conniving; scutellum rhomboidal, having a transverse suture near the tip, between which and the suture it is furrowed longitudinally: metathorax very short: propodeon large, obconic, slightly decumbent: podeon stout, short: abdomen linear, flat, shining, very minutely squameous, shorter and narrower than the thorax; metapodeon concave, occupying nearly one-third of the dorsum; octoon very short; ennaton a little longer than the octoon; decaton still longer; protelum longer than the decaton; paratelum shorter than the protelum; telum short: legs fulvous; coxæ and hind thighs green; fore and middle thighs green toward the base; tips of the tarsi fuscous: wings limpid; nervures piceous; humerus much shorter than half the length of the wing; ulna less than half the length of the humerus; radius nearly twice the length of the ulna; cubitus much shorter than the ulna; stigma of moderate size, emitting rather a long branch.

Female.—Head cupreous: antennæ like those of the male; club fusiform, twice the length of the tenth joint: abdomen green, varied with cupreous, fusiform, concave above from the base till towards the tip, keeled beneath, a little shorter and narrower than the thorax; metapodeon occupying rather more than one-fourth of the dorsum; octoon about half the length of the metapodeon; ennaton as long as the octoon; decaton as long as the ennaton; protelum shorter than the decaton; paratelum shorter than the protelum; telum short.

Alten.

Seladerma Saurus, fem. *Cyaneum, antennis piceis, pedibus flavis, alis limpidis.* (Corp. long. lin. $1\frac{1}{2}$; alar. lin. $2\frac{1}{4}$.)

Body blue: head and thorax convex, finely squameous: head a little broader than the thorax: antennæ piceous, subclavate, as long as the thorax; first and second joints blue; first joint long, slender; second cyathiform; third and fourth very minute; fifth and following joints to the tenth successively shorter and broader; club fusiform, twice the length of the tenth joint: thorax oval: prothorax transverse; its breadth much more than twice its length: sutures of the parapsides very distinct, approaching each other; axillæ large, triangular, not conniving; scutellum rhomboidal: metathorax transverse, very short: propodeon obconic, declining: podeon very short: abdomen fusiform, smooth, shining, concave above, slightly keeled beneath, narrower and very much longer than the thorax; metapodeon large; octoon and the following segments of moderate size: legs yellow; coxæ blue; tips of the tarsi fuscous: wings limpid; nervures fulvous; humerus much less than half the length of the wing; ulna hardly half the length of the humerus; radius much longer than the ulna; cubitus shorter than the ulna, emitting a short branch.

Alten.

Seladerma Lalage, Hammerfest.

Gastrancistrus Panares, fem. *Cyaneo-viridis, antennis nigris, oviductu exerto abdominis dimidio vix breviore, pedibus fulvis, femoribus viridibus, alis subfuscis.* (Corp. long. lin. $\frac{2}{3}$; alar. lin. $1\frac{1}{4}$.)

Body bluish green: head and thorax convex, shining, very minutely squameous, almost smooth: head transverse, as broad as the thorax; front vertical: antennæ black, clavate, not longer than the thorax: thorax robust, elliptic: prothorax transverse, narrower in front, its breadth much more than twice its length: scutum of the mesothorax rather long; sutures distinct, approaching each other; scutellum rhomboidal: metathorax transverse, very short: propodeon obconic, decumbent: podeon very short: abdomen much compressed, smooth, a little longer than the thorax but not half its breadth: oviduct fulvous; sheaths fuscous, nearly half the length of the abdomen: legs dark fulvous; coxæ and thighs green: wings slightly fuscous; nervures piceous; humerus much less than half the length of the wing; ulna rather more than half the length of the humerus; radius a little longer than the ulna; cubitus more than half the length of the ulna; stigma of moderate size, emitting a short branch.
Alten.

Eutelus inornatus (*Ent. Mag.* ii. 363). Alten.
Pteromalus Crocale (*Monog. Chal.* i. 239). Alten.
Pteromalus sylvicola (*Ent. Mag.* ii. 481). Alten.

Pteromalus Iera, mas. *Cyaneo-viridis, abdomine cupreo, antennis piceis, pedibus flavis, femoribus fulvis, alis limpidis.* Fem. *Abdomine cyaneo-viridi, disco purpureo, antennis nigris, pedibus fulvis, femoribus viridibus.* (Corp. long. lin. $1\frac{1}{2}$—$1\frac{3}{4}$; alar. lin. $2\frac{1}{4}$—$2\frac{1}{2}$.)

Male.—Body long and slender: head and thorax bluish green, convex, finely squameous: head a little broader than the thorax: antennæ piceous, filiform, slender; first joint yellow, long, slender, piceous towards the tip; second cyathiform; third and fourth very minute; fifth and following joints to the tenth long, linear, successively but slightly decreasing in length; club fusiform, more than twice the length of the tenth joint: thorax elliptical: prothorax very short: scutum of the mesothorax rather long; sutures of the parapsides very indistinct; axillæ large, triangular, not conniving; scutellum rhomboidal: metathorax very short: propodeon large, obconic, almost horizontal, having a rim on each side and a ridge along the middle: podeon very short: abdomen linear, smooth, shining, cupreous, a little narrower but not shorter than the thorax, having an indistinct yellow spot towards the base which is bright green; metapodeon occupying about one-fourth of the dorsum; octoon not half the length of the metapodeon; ennaton as long as the octoon; decaton a little longer than the ennaton; protelum as long as the decaton; paratelum longer than the protelum; telum short: legs bright yellow; coxæ green; thighs fulvous; tips of the tarsi fuscous: wings limpid; nervures fuscous; humerus much less than half the

length of the wing; ulna more than half the length of the humerus; radius nearly as long as the ulna; cubitus much shorter than the radius; stigma small, emitting a short branch.

Female.—Head as broad as the thorax: antennæ black, slender, clavate, shorter than the thorax; first joint long, slender; second cyathiform; third and fourth very minute; fifth and following joints to the tenth successively shorter and broader; club elliptical, broader than the tenth joint, and more than twice its length: abdomen fusiform, nearly as long as the thorax, bluish green, purple along the disc, concave above, keeled beneath; metapodeon occupying a little more than one-third of the dorsum; octoon and the following segments short, but successively increasing in length: legs fulvous; thighs green; tips of the tarsi piceous.

Alten and Hammerfest.

Pteromalus Musæus, fem. *Æneus, antennis basi fulvis, pedibus fulvis, femoribus viridibus, tibiis apice tarsisque flavis, alis limpidis.* (Corp. long. lin. $1\frac{3}{4}$; alar. lin. $2\frac{1}{2}$.)

Body æneous, very robust: head and thorax convex, finely squameous: head transverse, as broad as the thorax: antennæ fulvous?; first joint long, slender; second cyathiform: thorax oval, very thick, broader before than behind: prothorax transverse, very short: scutum of the mesothorax broad; sutures of the parapsides very indistinct, approaching each other; axillæ large, triangular, not conniving; scutellum rhomboidal: metathorax very short: propodeon transverse, decumbent: podeon extremely short: abdomen elliptical, smooth, shining, attenuated at the tip, flat above, keeled beneath, much longer and narrower than the thorax; metapodeon of moderate size, less than one-fourth of the length of the abdomen; octoon much shorter than the metapodeon; ennaton, decaton and protelum each as long as the octoon; paratelum longer than the protelum; telum as long as the paratelum: legs fulvous; coxæ and thighs green; tarsi and tips of the tibiæ yellow: wings limpid; nervures fulvous; humerus much less than half the length of the wing; ulna little more than half the length of the humerus; radius longer than the ulna; cubitus much shorter than the ulna; stigma small, emitting a very short branch.

Alten.

Pteromalus Pyttalus, fem. *Æneus, antennis piceis, pedibus fulvis, femoribus viridibus, tarsis flavis, alis obsolete fuscis.* (Corp. long. lin. $\frac{3}{4}$—1; alar. lin. $1\frac{1}{4}$—$1\frac{1}{2}$.)

Body æneous, short: head and thorax convex, finely squameous: head rather large, a little broader than the thorax: antennæ dark piceous, clavate, as long as the thorax; first joint long, slender; second cyathiform; third and fourth very minute; fifth and following joints to the tenth successively shorter and broader; club conical, more than twice the length of the tenth joint: thorax oval: prothorax transverse, very short: scutum of the mesothorax short, broad; sutures of the parapsides very indistinct; scutellum rhom-

boidal: metathorax very short: propodeon transverse, short, decumbent: podeon extremely short: abdomen a little longer than broad, smooth, shining, flat above, slightly keeled beneath, shorter and broader than the thorax; metapodeon occupying rather more than one-third of the dorsum; octoon not more than half the length of the metapodeon; ennaton shorter than the octoon; decaton still shorter; protelum as long as the decaton; paratelum and telum very short: legs fulvous; coxæ and thighs green; tarsi yellow, their tips fuscous: wings very slightly tinged with brown; nervures fulvous; humerus much less than half the length of the wing; ulna hardly more than half the length of the humerus; radius a little shorter than the ulna; cubitus very nearly as long as the radius; stigma very minute, emitting a short branch.

Alten.

Pteromalus Rhinthon, fem. *Cyaneus, antennis piceis, pedibus fulvis, femoribus viridibus, tibiis fusco-cinctis, alis limpidis.* (Corp. long. lin. $1\frac{1}{4}$; alar. lin. 2.)

Body dark blue: head and thorax convex, squameous: head hardly broader than the thorax: antennæ dark piceous, clavate, shorter than the thorax; first and second joints dark blue; first joint long, slender; second cyathiform; third and fourth very minute; fifth and following joints to the tenth successively but very slightly increasing in breadth and decreasing in length; club conical, twice the length of the tenth joint: thorax oval: prothorax very short, its length not equal to one-fourth of its breadth: scutum of the mesothorax broad; sutures of the parapsides very indistinct; axillæ large, triangular; scutellum rhomboidal, prominent: metathorax transverse, very short: propodeon obconic, decumbent: podeon extremely short: abdomen elliptical, smooth, shining, attenuated towards the tip, concave above, slightly keeled beneath, a little narrower and longer than the thorax; metapodeon of moderate size; octoon short; ennaton and the following segments longer: legs fulvous; coxæ and thighs blue; tibiæ fuscous, their tips fulvous: wings limpid; nervures fulvous; humerus much less than half the length of the wing; ulna not half the length of the humerus; radius longer than the ulna; cubitus a little shorter than the ulna; stigma small, emitting a short branch.

Isle of Soröe, Finmark.

Pteromalus Mazaces, mas. *Viridis, abdomine basi fulvo, antennis fuscis, pedibus flavis, alis subfulvis.* (Corp. long. lin. 1; alar. lin. $1\frac{3}{4}$.)

Body dark green: head and thorax convex, finely squameous; head a little broader than the thorax: antennæ fuscous, subclavate, as long as the thorax; first and second joints fulvous; first joint long, slender; second cyathiform; third and fourth very minute; fifth and following joints to the tenth successively shorter and broader; club conical, more than twice the length of the tenth joint: thorax oval:

prothorax very short: scutum of the mesothorax broad; sutures of the parapsides indistinct; axillæ large, triangular; scutellum rhomboidal: metathorax very short: propodeon short, decumbent: podeon very short: abdomen circular, smooth, shining, concave, a little broader and much shorter than the thorax, having a fulvous spot towards the base; metapodeon large; octoon and the following segments short: legs yellow; coxæ green: wings having a slight fulvous tinge; nervures fulvous; humerus much less than half the length of the wing; ulna more than half the length of the humerus; radius not longer than the ulna; cubitus hardly more than half the length of the ulna; stigma small, emitting a very short branch.

Alten.

XLIV.—*Observations on the Gasteropod Mollusca, designated by the name of* Phlebenterata *by M. de Quatrefages.* By M. Souleyet*.

M. de Quatrefages has communicated to the Academy of Sciences a series of researches upon a group of Gasteropod Mollusca, whose organization differs widely, according to that naturalist, from that of the animals of the same type, and presents very singular peculiarities. M. de Quatrefages says, in fact, that he has observed in these Mollusca the partial or complete disappearance of the organs of circulation, whence would result a corresponding degradation in the respiratory organs; and he is moreover very much inclined to the opinion that the posterior aperture of the digestive tube disappears even in some of these Gasteropods, which would consequently bring them much nearer to animals of the most simple structure—the *Medusæ* for example.

The strangeness of these results, which appear to me contrary not only to all known facts on the organization of Mollusca, but also to all admitted and recognised principles in zoology, led me to extend the researches which I made some years ago on the anatomy and physiology of these animals, to those which form the subject of the memoirs published by M. de Quatrefages. Having already had occasion to observe some of these Gasteropods during the expedition round the world of the Bonite, I endeavoured to complete this investigation by that of species which are found on our coasts; but, as I cannot yet submit to the Academy the work which I have written on this subject, and which is retarded by the execution of the drawings accompanying it, I meantime request permission to state succinctly some of the results at which I have arrived, and which appear to me to contradict almost entirely those announced by M. de Quatrefages.

It is known that among the Mollusca in question there are first

* From the *Comptes Rendus* for August 12th, 1844.

the *Eolides* and some other closely allied genera*, *Cavolina, Tergipes, Calliopæa, Glaucus,* &c., genera which often differ only in external characters of little importance, and which certainly form in the class of Gasteropoda one of the most natural families. However, according to the observations of M. de Quatrefages, these mollusca present in their internal structure the greatest differences: thus the *Eolides* have a heart and arteries, without a venous system, and in the other genera of the same group which this naturalist examined, there no longer existed any trace of the circulatory apparatus. I have observed *Cavolina, Calliopæa, Glaucus, Tergipes* (a genus which appears to me to have the nearest relation to the genus *Amphorina* proposed by M. de Quatrefages), as well as a mollusk which presented the characters assigned by Messrs. Alder and Hancock to their genus *Venilia,* to which M. de Quatrefages has himself referred his genus *Zephyrina,* and I can affirm that all these mollusca have a heart and an arterial system, disposed as in the *Eolides.* It is not very difficult to ascertain the existence of these organs, provided we do not investigate these animals solely as transparent objects.

I have stated, that even if M. de Quatrefages admits the existence of a heart and arterial system in some of these mollusca, it is not the same with the venous system which he says explicitly is wanting in all; and as it was nevertheless necessary to explain, in the *Eolides,* the return of the blood towards the circulatory centre, this naturalist supposes that this fluid, after having traversed the arteries, is distributed in the general cavity of the body, whence the contractions of the animal propel it in successive waves to the ventricle. Admitting even this theory as probable, the following anatomical fact, easy of verification in the large species of *Eolis,* appears to me to destroy it completely. If, after having opened carefully the pericardium, we inject the auricle by the ventricle (an experiment which I have several times performed on the *Eolis Cuvierii,* common on the coasts of the British Channel) and propel the liquid slowly, we soon see this

* I do not think we can enumerate among these genera, *Eolidina,* which differ from the *Eolides,* according to M. de Quatrefages, *by the absence of labial tentacles,* these tentacles not existing in any of the known species of the genus *Eolis.* Some authors, from examining individuals contracted by alcohol, have taken for tentacular prolongations, the lateral points formed by the anterior margin of the foot, and have thus assigned three pairs of tentacles to these mollusca; but this error has been already noticed by everal naturalists.

Some other genera of this group, as *Cavolina, Amphorina, Zephyrina,* &c., do not rest equally upon characters sufficiently important or well-ascertained for us to adopt them; but I cannot here enter into a discussion of this subject.

liquid swell the auricle and at length penetrate into the thickness of the tissues of the external envelope, forming currents which it is possible to follow as far as the branchial appendices; I have never seen the injected liquid spread itself into the visceral cavity. It is also possible, by a very attentive examination, to recognise the small venous vessels which, from the viscera and especially from the ovary, proceed into the external envelope. But I must also recall the fact, that in most of the Mollusca, the venous system is much less apparent than the arterial system, and that it often happens, as M. de Blainville has pointed out in his 'Traité de Malacologie,' that the sides of the venous vessels, already extremely thin, are moreover so blended with the tissue of the parts, that it becomes very difficult to recognise them: most commonly then these venous vessels only assume a very distinct vascular appearance in the large trunks which go to the respiratory organs, when the latter are *very circumscribed*; but if these organs do not present this last character, as is the case evidently in the *Eolides*, the venous system will necessarily present an analogous diffusion. Facts therefore appear to me to agree with reasoning and with analogy, to prove that the venous system really exists in the *Eolides* and in all the other mollusca of the same group.

The details into which I have entered, and those in addition which it will be possible for me to give on the structure of the external appendices of these mollusca, will also show, I hope, that these appendices perform really the respiratory functions.

M. de Quatrefages thinks he has discovered the reason of the degradation of the organs of circulation and respiration in the Mollusca *Phlebenterata* in an anatomical peculiarity first observed by MM. Milne Edwards and Lowèn in *Calliopæa* and *Eolis*, and which consists in a prolongation of the digestive cavity in the appendices of the branchiæ. That naturalist is of opinion that this disposition of the digestive tube has the object of supplying the absence of the organs of respiration, by permitting the direct action of the air on the nutritive matters.

The following facts and arguments appear to me again wholly to contradict this theory:—

1. If such were really the object assigned by nature to that organic disposition, there ought evidently to be a relation between the progressive degradation of the organs of respiration and circulation and the development of those *ramifications* of the digestive cavity which should supply their functions: now precisely the contrary takes place. Thus the *Eolides*, which, according to M. de Quatrefages himself, still possess a circulation and numerous branchial appendices, have also a *very ramified* digestive tube; and the last genera of his order which he designates under

the names of *Pelta* and *Chalidis,* which possess neither circulation nor respiratory appendices, do likewise not present any trace of these *ramifications* of the digestive cavity.

2. If we study the internal structure of the branchial appendices in all these mollusca, we see that the prolongations of the digestive cavity which traverse the centre are always separated from the dermoidal envelope (as is represented in the drawings of M. de Quatrefages) by a layer more or less thick, according to the size of these appendices, of a granulous brownish or yellowish substance, which that naturalist has considered to be the liver ;—a conclusion which I completely adopt, because it seems to me really impossible to give a different one. We must then admit that the oxygenation of the nutritive matters would be through this organ, and that nature, which in the construction of the parts destined to the function of respiration has always sought to bring as near as possible the external fluid with the liquid upon which it has to act, would have here followed quite a contrary rule.

3. Admitting that this action of the air was still possible, notwithstanding what I have just said, it would yet be necessary to explain, how the nutritive fluid, after having undergone it, could be carried into the different parts of the body, in animals which present no trace of organs of circulation.

4. If we are not preoccupied with the idea of finding in the organization of these animals an organic combination which takes the place of the apparatus of respiration and circulation, since these apparatus exist according to my observations, we may give a much more natural explanation of this *ramified* disposition of the digestive tube in the *Eolidina.* In fact, as I have already said, these ramifications terminate in the liver, and as I shall easily make clear, the trunks which furnish them *always open* into the stomachal pouch, it seems to me to follow naturally that these ramified canals are biliary ducts ; thus we find them almost always filled with a thick and brownish matter having all the appearance of bile. This *gastro-biliary* apparatus (a denomination which appears to me more suitable than that of *gastro-vascular*) differs from the same apparatus in most of the other mollusca only in the fact that the biliary vessels, instead of uniting successively to form a single trunk, form on each side a series of canals which open detached in the stomachal pouch, and it is easy to detect the connexion which exists between this disposition and the kind of diffusion which, so to speak, the liver presents in all the appendices which cover the back of the animal. In another mollusk, on the analogies of which zoologists are still very uncertain,

but which, it seems to me, in many relations, must be placed by the side of the *Eolides, Phylliroé,* the liver occurs in the form of cæca which open detached into the stomachal cavity, and thus presents a disposition which leads to that which is observed in all the mollusca of the family of the *Eolides*; only that, in these last, the cæca of the liver, instead of remaining internal, become external, propelling, so to speak, the skin before them,—a remarkable and wholly exceptional peculiarity, which belongs perhaps to some biological circumstances in these mollusca.

In his last communication to the Academy, M. de Quatrefages has expressed the opinion that this division of the liver was necessitated by the *ramified* disposition of the digestive cavity; but this necessity is not very evident, and, according to what I have said above, this position of the liver around ramifications of the stomach is, on the contrary, wholly in contradiction to the functions which that naturalist assigns to them.

I have already said that this gastro-biliary apparatus always opens into the stomachal cavity, and in fact M. de Quatrefages is wrong in making it terminate thus in the intestine or in the buccal cavity. As I cannot enter here into details on this subject, I shall only remark that, in all these mollusca, the intestine properly so called has escaped the researches of this naturalist; this has caused him to assign a false position to the anus, or has led him to mistake the existence of that aperture*.

In the statement which I have just given of the result of my researches on the *Eolides* and the other genera which belong to the same group, I have mentioned only what appeared to me to have a reference to the general questions raised by M. de Quatrefages; but I should observe, that on several other points my observations disagree with those of that naturalist, and especially on the organs of generation, whose conformation appears to me not at all to resemble the description which he has given of them: I shall show in fact that this apparatus is wholly analogous to that of the other Nudibranch Mollusca, and especially of the *Tritoniæ*.

Amongst the other genera of Mollusca which M. de Quatrefages has arranged after the Eolidians, in his order *Phlebenterata,* is Oken's *Acteon,* and which is identical, as I have assured myself, with the genus described by M. Risso under the name *Elysia.* The observations which I have made on this small mollusk are quite opposed to those of M. de Quatrefages, who moreover

* The description which M. de Quatrefages has given of the gastro-biliary apparatus in the *Eolidina* is wholly inexact; the canals which lead from the stomachal cavity never terminate in lateral trunks, as is represented in the figure given by that naturalist.

has given only a very insufficient description; I can however only indicate here briefly the errors which he appears to me to have committed.

1. Contrary to the assertions of this naturalist, the *Acteon* has a heart, an arterial system, &c.; in a word, a complete apparatus of circulation which has much analogy with that of the *Eolides*.

2. The dorsal pouch which M. de Quatrefages has considered as the stomach, and from which proceed the ramified canals which cover, above, the lateral expansions of the animal, has no communication with the digestive tube; it is a distinct apparatus which opens externally by a peculiar orifice placed behind that of the anus, and which seems to serve for the respiration in this mollusk. In the same way the ramifications of this apparatus have no communication with the vesiculous *ampulliform* organs, which thus in no way present the regular position which this naturalist assigns to them in his figures.

3. The whole digestive tube, from the buccal cavity, the description of which likewise differs from my investigations, appears to have escaped the observation of M. de Quatrefages.

4. The position which M. de Quatrefages assigns to the anus, at the posterior and median portion of the body, is certainly inaccurate; there is at that point neither orifice nor cloacum. The anal aperture is situated at the anterior and dorsal part of the animal on the right side, and always occurs in the form of a small protuberance, which is easy of detection.

5. The genital orifice is not *simple*, and has likewise a different position to that which M. de Quatrefages assigns to it; the aperture of the oviduct is on the right side, in a small groove which descends from the anus towards the lower surface of the animal; that of the male organ is situated on the same side, at the base of the tentacle.

My observations on the zoological characters of *Acteon* agree entirely with those which have been communicated to me by M. Vérany of Genoa, who has often had opportunities of observing this small mollusk.

M. de Quatrefages has given no detail on the reproductive apparatus of *Acteon*; but he appears to say that the arrangement of that apparatus is the same as that which he indicates in a succinct manner in his genus *Acteonia*: in that case, I might still affirm that the organs of generation in *Acteon* have no analogy with the description which is given by that naturalist.

I can say nothing of the genera *Acteonia*, *Placobranchus*, *Pelta* and *Chalidis*, which are also included in the order of the *Phlebenterate* Mollusca of M. de Quatrefages, not having been able as yet to procure these mollusca. But of these genera, the first or *Acteonia* does not differ from *Acteon*, according to this

naturalist himself, who moreover has given no other detail respecting its internal organization than the short description of the generative apparatus which I have already noticed. It is then a genus concerning which nothing can be determined. The genus *Placobranchus*, established by Van Hasselt, has been referred to this order solely from the analogy which it presents with the genus *Acteon*. The last two genera, *Pelta* and *Chalidis*, then remain, on the subject of which it is impossible for me to oppose my observations to those of M. de Quatrefages*. If however we consider the numerous errors of observation which I have pointed out in the investigations of that naturalist, and the proofs of which it will be easy for me to furnish,—if moreover we admit that these errors may have been more easy to commit on animals which are almost microscopical, it will follow, I think, that the facts which M. de Quatrefages has enumerated in the organization of these mollusca do not present a degree of certainty sufficient to be accepted in sound zoology,—these facts being in contradiction to all other received facts and to all analogy.

In replying to the assertions of M. de Quatrefages in this short notice, I have had occasion sometimes to argue upon facts which do not appear to me to have received the most rational explanation, and every one may consequently appreciate the value and justness of my arguments; but most frequently I have found that I disagreed with the facts themselves, and have then been obliged to question their accuracy. I am aware that it remains for me to oppose *facts* to them; but these proofs, which I have in my possession, I shall submit together with my work to the Academy, and they will, I hope, place beyond a doubt all that I have advanced and all that I have objected to.

XLV.—*On* Thalassidroma melitensis, *Schembri, a supposed new species of Stormy Petrel.* By H. E. Strickland, M.A.

In the valuable paper on the birds of the Ionian Islands by Capt. H. M. Drummond (Annals of Nat. Hist. vol. xii. p. 422), that gentleman remarks that the bird which he had considered to be *Thalassidroma pelagica* was more probably the *T. melitensis*, a new species discovered at Malta by Sig^r. Schembri, and supposed to be peculiar to the Mediterranean. In the excellent little work of the last-named author, entitled 'Catalogo Ornitologico del Gruppo di Malta,' published in 1843, is a description and figure of the *Thalassidroma melitensis*, the distinctive characters of which

* I have not been able to examine the objects collected and described by M. de Quatrefages, that naturalist not having deposited them in the galleries of the Museum.

were supposed to consist in the basal portion of the lateral tail-feathers being white, while the *T. pelagica* is described by most authors as having the tail wholly black. I had however for some time suspected that the *melitensis* and *pelagica* were identical, having observed in my own specimen of *pelagica* that the lateral rectrices were in fact white towards the base, though this colour is nearly concealed by the incumbent tail-covers.

By the kindness of Capt. Drummond I am now enabled to set at rest these doubts, having just received from him several specimens of the supposed species named *melitensis*, obtained at Malta, but which turn out to be quite identical with the *Thalassidroma pelagica* of the British seas. This opinion is confirmed by Mr. G. R. Gray, to whom I have sent one of Capt. Drummond's specimens, and who assures me that he has compared it with the specimens of the true *pelagica* in the British Museum, and that he can find no distinctions between them.

Capt. Drummond (who is now at Malta) has communicated to me the following corrections to be made in his papers on the birds of the Ionian Islands and of Crete.

The species entered as *Picus major* (Annals, vol. xii. p. 418) should be *P. leuconotus*,—the *P. major* not being found in Corfu.

The birds which are sold at Malta to the uninitiated for snipes (p. 418) are the *Upupa epops*, and not (as stated through a misprint) the *Yunx torquilla*.

The falcon mentioned at p. 423, as chasing beetles in the evening in Crete, is proved on further examination to be the *Falco Eleonoræ*, and not *F. subbuteo*, which last species was not noticed in Crete. *Falco Eleonoræ* may also be included, though as a rare bird, in the fauna of the Ionian Islands, a specimen having been obtained from the island of Fano.

XLVI.—*Record of the discovery of an Alligator with several new Mammalia in the Freshwater Strata at Hordwell.* By Searles Wood, Esq. F.G.S.

Dear Sir, York, Oct. 23, 1844.

As the Report in the Athenæum of the late Meeting of the British Association here, does not contain any abstract of the highly important discoveries made by Mr. Searles Wood in the freshwater strata at Hordwell, perhaps you will find room in the forthcoming Number of the 'Annals' for a brief notice of this gentleman's researches.

Yours, dear Sir, most faithfully,
Edward Charlesworth.

Richard Taylor, Esq.

Part of the summer of 1843 was devoted by Mr. Wood to an

examination of the celebrated freshwater cliff at Hordwell in Hampshire, and upon quitting England in the early part of this year Mr. Wood intrusted to me for publication the new fossils which he had discovered, accompanied by manuscript notes. To these he requested I would append such remarks as a more full examination of the respective specimens might enable me to furnish.

Of the remains in question referable to the Mammalia, the most instructive specimen is an imperfect cranium of a Pachydermatous quadruped, for which Mr. Wood proposes the generic name *Microchœrus*. It comes very near *Hyracotherium* in the general aspect of the molar teeth, but its size could hardly have exceeded that of the hedgehog (*Erinaceus europæus*). It had moreover no interspace between the second and first spurious molar, nor between this last-named tooth and that which in *Hyracotherium* Prof. Owen regards as a canine. The last molar also differs very decidedly in shape from that of *Hyracotherium*, but until more species of this group are known, generic distinctions can only be regarded as provisional, and in the present case the characters assumed as generic may hereafter prove to be only specific. Most fortunately one ramus of the lower jaw was found with the above, demonstrating that *Microchœrus* has that remarkable prolongation backwards of the angle so strikingly displayed in *Chœropotamus*.

Mr. Waterhouse takes the following view of the dental formula of this genus:—

Incisors $\frac{2-2}{1-1}$; canines $\frac{0-0}{0-0}$; false molars $\frac{4-4}{4-4}$; true molars $\frac{3-3}{3-3}$; = 34.

1st. The specific name of *erinaceus* is proposed by Mr. Wood for this new addition to British fossil Mammalia.

2nd. Part of the upper jaw of a very small nondescript mammal, with highly complicated molar teeth, clearly insectivorous, but not sufficiently perfect to decide upon its generic relations*.

3rd. A trifid mammalian tooth cleft nearly to the base of its crown as in the genus *Stenorhynchus*, and which I believe to be the tooth of a seal.

4th. A mammalian tooth remarkably compressed, with a single lateral lobe. I think this may also be referable to a seal.

* Mr. Flower of Croydon, stimulated by Mr. Wood's success, pursued the investigation of the Hordwell cliff, and along with other interesting fossils obtained a considerable portion of the lower jaw of a small insectivorous mammal, which he was so obliging as to lend to Mr. Wood, that it might be described along with the new mammalia previously discovered. For this fossil I suggested at the Meeting of the British Association the provisional generic term *Spalacodon*.

5th. A scapula, apparently of the *Palæotherium*, in fine preservation; also a portion of the upper jaw with several molar teeth *in situ*.

6th. A great portion of the head of an alligator, having nearly all the upper range of teeth (42 in number) remaining, along with the humerus, dermal scutæ and other parts of the skeleton.

This fossil, I think, may be regarded as the most interesting Saurian relic yet discovered in British or continental tertiary strata. The remains were imbedded in the fine siliceous sand of which the freshwater deposit at Hordwell is chiefly composed, and with the exception of a change in colour and chemical composition, are presented to the study of the palæontologist in a state which would challenge comparison with those of any recent skeleton. Mr. Wood's discovery too constitutes I believe the *first* authentic record of the occurrence of the alligator in the fossil state. In the same deposit this gentleman found numerous scales and vertebræ of the *Lepidosteus*, a genus of fishes now associated with the alligator in the new world. Mr. Wood proposes to call the Hordwell alligator *A. Hantoniensis*.*

BIBLIOGRAPHICAL NOTICES.

Naturgetreue Abbildungen und Beschreibungen der essbaren, schädlichen und verdächtigen Schwämme. Von J. V. Krombholz. Prag, 1831–1843.

Eight parts of this splendid work, containing sixty-two plates, were published, when it was arrested by the death of the author in the course of last autumn. Fourteen more plates however had been engraved before the 'Epicrisis' of Fries was published in which they are quoted, and which appeared in 1836, but was some time previously in the hand of the printer. These we have obtained from Prag through the kindness of M. Corda; and we believe that the drawings from which they were made are lost together with the greater part of the specimens; there is therefore no probability of their ever being published. The work then must be considered as ending with the sixty-second plate, and we confidently recommend it as a storehouse of excellent figures which are due to the pencil of M. Corda, who is no less happy in the delineation of larger objects than in the minute forms of fungi, on which he has thrown so much light; indeed the whole execution of the work is due to him, Krombholz himself having done little more than the editorial part. The figures and dissections, it must be remembered, were made some time before the recent discoveries of the true structure of the hymenium, and at a time when M. Corda was neither so practised in the use of the microscope nor possessed of so good an instrument as at present; the analyses therefore are not what one would expect from

* It is Mr. Wood's intention shortly to publish a more detailed account of these fossils, accompanied by illustrations.

his other works, nor indeed are they always correct,—a charge which however lies at the door of almost every observer of hymenomycetous fungi at that time. The principal feature of the work however is the beauty and faithfulness of the larger figures, the analyses being a very subordinate part; and whatever reproach may be thrown on this part of the work, it is but justice to assert that no mycologist has published more faithful analyses of fungi than M. Corda. For proof we appeal not only to the uniformly increasing merit of his 'Fasciculi,' each surpassing the other in importance and skill of execution, but to ocular evidence afforded by a comparison of many of his most curious genera, such as *Dictyosporium*, *Helicostylum*, *Cladotrichum*, &c., under the microscope with the published figures, and we have not been struck more by the curious forms and structures which presented themselves than by the great accuracy of the figures. It has fallen to the lot of few to discover more novelties, and these as beautiful as singular, than to M. Corda; indeed so curious are many of them, that occasionally he has met with the fate of original thinkers and fortunate observers, and his discoveries instead of exciting admiration have been met with doubt. It was therefore with great pleasure that we received a packet of specimens, in many cases portions of the very individual figured, which have enabled us at once to do justice to the author, and to refer to the 'Fasciculi' as a repertorium of facts; and we are in some measure the more pleased to be able to do so, since we do not always agree with his views either as to genera or species, and we regard the work rather as that of an original observer than of a profound critic. We are rejoiced too to find that his labours in the study of antediluvian phytology, which will soon be given to the public, and will present the most magnificent analyses which have hitherto been published, have not drawn him off entirely from mycology, but that he has a sixth fasciculus in hand, and is preparing a new edition of his 'Introduction to Mycology,' a work which should be in the hands of every botanist. It remains only that we say of the work which has given occasion for these remarks, that though the figures are too much crowded, which takes off greatly from the general effect, and the form itself of the book, oblong folio, not accordant with English taste, some of the plates, when confined to a single species, may be compared without risk to the beautiful plates of Vittadini and Viviani, and that in most cases the figures individually are all that can be wished. As the plates are lithographed, and if, as it is probable, a few copies only were taken off, in a short time it will not be possible to procure the work from the publisher.

Histoire physique, politique et naturelle de l'Ile de Cuba. Par M. Ramon de la Sagra.

Botanique: Plantes Cellulaires. Par Camille Montagne, D.M. Paris, 1838–1842.

The distinguishing feature of this work from others of a similar description which have emanated from the study of the French *savans*, consists in the extraordinary ability and patience with which the

general introductory remarks to each order have been prepared. We have already given a translation of those on the order Fungi, from which our readers may judge of the information to be derived from them: nor has the excellence of this particular portion been appreciated only in England, for it has been translated into German and Italian, and a Spanish version is now in the course of publication; indeed it may be pronounced almost a complete repertorium of mycological facts, and these put forth with a clearness and precision which is very rare. Nor will those who are more especially interested in other portions of cryptogamic botany find less to interest and instruct.

The class Algæ is taken in a very wide sense, as including the three families of *Phyceæ*, *Byssaceæ*, and *Lichenes*; and the author's reasons for this distribution, which accord with those of Fries, are detailed in a manner which cannot fail to be attractive. The considerations on *Byssaceæ*, a very difficult and anomalous tribe of plants, though short, are especially worth attention, and the illustrations of the genera *Collema* and *Leptogium*, which accompany them, are more complete than any that have hitherto appeared, and show such a difference of structure between these genera and Lichens, which to the external eye they so closely resemble, as would surprise any one who has not paid a close attention to the composition of the thallus in these curious productions. In fact, in these plants the cortical and medullary strata are confused, and the gonidia, which in Lichens are confined to the cortical stratum, are in consequence dispersed through the gelatinous mass: thus they hold a place exactly intermediate between *Phyceæ* and Lichens. It is probable indeed that some plants usually referred to *Byssaceæ*, as *Thamnomyces*, are in reality Fungi, and we are inclined to think that *Dichonema* is in the same predicament: in this genus, as in *Cora*, the reproductive bodies will, we venture to predict, be found seated upon sporophores. *Cœnogonium* again is so completely a *Biatora* with a filamentous thallus, that we cannot help thinking that mature consideration will remove it from *Byssaceæ*, an unfortunate and inexpressive name; and thus the class will form a natural division, consisting of such genera as *Collema*, *Leptogium* and *Lichina*.

As regards the general execution of the work, the number of new and interesting species described, the beauty and correctness of the plates, the fullness of the analysis, and the ability and tact displayed, we cannot speak too highly. We know not that any work on natural history can be pointed out which can at all compete with it; and though the number of new species is considerable, the author has exercised the greatest caution in proposing them as new, and not till after a complete examination of all available information, and the submission of specimens before publication to those whom he considered as most competent to give information. Since the publication of the work, a comparison which we have been enabled to make with authentic specimens of Swartz in the Herbarium of the British Museum has enabled us to make two corrections, which the excellent author will be the very first to appreciate. His *Polyporus*

Valenzuelianus proves to be identical with Swartz's *Bol. resupinatus*, —a fact which never could have been discovered without original specimens, the very name alone being quite enough to prevent the origin of any such suspicion; and *Pol. Auberianus* with *Bol. microporus*, Swartz, which seems to be a species universally distributed in the West Indies, and of which we possess a beautiful specimen from Jamaica.

Many of the species have been already characterized in the 'Annales des Sciences Naturelles,' but as it is useful to have a list of species to avoid identity of names, we shall subjoin a catalogue of those that have first appeared on the publication of the volume.

This is the first attempt to illustrate the cellular plants of Cuba; but even the higher plants of this island are at present but imperfectly known, and we hope that it may lead to similar illustrations of the other more important isles, abounding as they all do in the most varied and curious forms. No expense has been spared in the present instance to do justice to the subject, and the science of Dr. Montagne has been well seconded by the pencil of Alfred Riocreux, a young artist of the greatest promise. The analyses are all from the practised pencil of the author himself.

It remains only that we give a list of the species here first characterized, while we congratulate the author on the happy termination of his labours, and the additional frond which it contributes to the wreath which he wears so modestly amongst cryptogamists:—

PHYCEÆ.

Biddulphia australis.
Bryopsis ramulosa.
Caulerpa fastigiata.
Bostrychia, n. g., founded on
Rhodomela calamistrata, *Mont.*
Sphærococcus corallopsis.
Ectocarpus minutulus.

LICHENES.

Strigula nitidula.
——— rotula.
Pertusaria entophlœa.
Thelotrema Auberianum.
Thelotrema olivaceum.
Opegrapha filicina.
Biatora pusilla.
Parmelia Valenzueliana.

MUSCINÆ.

Jungermannia Rhizantha.
Phragmicoma Sagræana.
Lejeunia phyllobola, *Nees & Mont.*
——— myriocarpa, *Nees & Mont.*
——— radicosa, *Nees in litt.*
——— cardiocarpa.
Lejeunia serrulata.
——— cubensis.
——— Auberiana.
Fimbriaria cubanensis, *Lehm.*
Hypnum Liliputianum.

PROCEEDINGS OF LEARNED SOCIETIES.

LINNÆAN SOCIETY.

June 4, 1844.—The Lord Bishop of Norwich, President, in the Chair.

Read a continuation of Mr. Griffith's memoir, being the portion relating to *Sarcophyte*.

Read also the conclusion of Mr. Woods's "Attempt to arrange the *Carices* of Middle Europe."

In this paper Mr. Woods passes in review the principal characters by means of which the species of *Carices* may be arranged into groups, and adopts with some modifications the system of Koch. His arrangement is as follows:—

A. Spicâ unicâ simplici.

1. Diœcæ; stigmatibus 2.
   1. *C. dioica*; 2. *C. Davalliana.*
2. Monœcæ; stigmatibus 2.
   3. *C. pulicaris*; 4. *C. decipiens*; 5. *C. capitata.*—6. *C. Suteri*, which may belong to the following division, as the number of stigmas is not indicated.
3. Monœcæ; stigmatibus 3.
   7. *C. microglochin*; 8. *C. pauciflora*; 9. *C. Pyrenaica*; 10. *C. spicata*, 11. *C. rupestris.*

B. Spicis capitatis involucratis.

12. *C. cyperoides*; 13. *C. Baldensis.*

C. Spicis compositis.

1. Stigmatibus 3.
   14. *C. curvula.*
2. Stigmatibus 2; floribus sterilibus in spicarum apice.
   15. *C. fœtida*; 16. *C. stenophylla*; 17. *C. lobata*; 18. *C. incurva*; 19. *C. schœnoides*; 20. *C. divisa*; 21. *C. chordorhiza*; 22. *C. vulpina*; 23. *C. muricata*; 24. *C. divulsa*; 25. *C. teretiuscula*; 26. *C. paradoxa*; 27. *C. paniculata.*
3. Stigmatibus 2; spicis aliis fertilibus aliis sterilibus, v. floribus sterilibus in mediâ spicâ, v. floribus sterilibus in aliis spiculis basalibus in aliis apicalibus.
   28. *C. ludibunda*; 29. *C. intermedia*; 30. *C. modesta*; 31. *C. arenaria*; 32. *C. repens*; 33. *C. microstyla.*
4. Stigmatibus 2; floribus sterilibus in spicarum basi.
   34. *C. brizoides*; 35. *C. Schreberi*; 36. *C. Ligerica*, Gay; 37. *C. stellulata*; 38. *C. grypos*; 39. *C. ovalis*; 40. *C. axillaris*; 41. *C. Bœninghausiana*; 42. *C. remota*; 43. *C. elongata*; 44. *C. lagopina*; 45. *C. heleonastes*; 46. *C. curta*; 47. *C. loliacea.*

D. Spicis distinctis, omnibus androgynis; floribus sterilibus in apice spicarum; stigmatibus 3.
   48. *C. Linkii*; 49. *C. Sarda.*

E. Spicis lateralibus ♀; terminali androgynâ, floribus sterilibus apicalibus; stigmatibus (nisi in *C. bicolore*) 3; fructu inconspicuè rostrato.
   50. *C. bicolor*; 51. *C. atrata*; 52. *C. aterrima*; 53. *C. nigra*; 54. *C. Vahlii*; 55. *C. Buxbaumii.*

F. Spicis distinctis; stigmatibus 2.

1. Fructûs rostro complanato marginato.
   56. *C. mucronata*; 57. *C. microstachya.*
2. Fructûs rostro parvo teretiusculo plerumque membranaceo.
   58. *C. Grahami*; 59. *C. saxatilis*; 60. *C. Goodenovii*; 61. *C. rigida*;

62. *C. cæspitosa*; 63. *C. trinervis*; 64. *C. aquatilis*; 65. *C. acuta*; 66. *C. Mœnchiana.*

G. Spicâ masculâ unicâ, fœmineâ unicâ vel pluribus; stigmatibus 3.

1. Spicis plerisque vel omnibus in apice culmi approximatis subsessilibus; fructûs rostro haud complanato vel bifido.

   67. *C. supina*; 68. *C. platystachya*; 69. *C. macrolepis*; 70. *C. gynobasis*; 71. *C. Grioletti*; 72. *C. tomentosa*; 73. *C. præcox*; 74. *C. mollis*; 75. *C. reflexa*; 76. *C. umbrosa*; 77. *C. pilulifera*; 78. *C. montana*; 79. *C. ericetorum.*

2. Spicis plerisque vel omnibus in apice culmi approximatis subcorymbosis, fœmineis pedunculatis masculæ subæqualibus; fructu glabro, rostro parvo membranaceo vel nullo.

   80. *C. rariflora*; 81. *C. limosa*; 82. *C. irrigua*; 83. *C. pallescens*; 84. *C. ustulata*; 85. *C. capillaris*; 86. *C. nitida*; 87. *C. alba.*

3. Characteres ut in G. 2; sed fructu pubescente.

   88. *C. digitata*; 89. *C. ornithopoda.*

4. Spicis cylindricis densissimis corymbosis; fructûs rostro robusto profundè bifido.

   90. *C. pseudo-cyperus.*

5. Spicis in apice culmi racemosis, summâ sessili, reliquis exsertè pedunculatis; fructûs rostro bidentato margine scabro.

   91. *C. fuliginosa*; 92. *C. frigida.*

6. Spicis plerisque in apice culmi sessilibus, vel inclusè breviter pedunculatis; fructu nisi in margine glabro, rostro complanato bifido.

   93. *C. extensa*; 94. *C. flava*; 95. *C. Mairii*; 96. *C. Œderi.*

7. Spicis racemosis per culmi longitudinem descendentibus, superioribus sessilibus vel breviter inclusè pedunculatis, inferioribus subexsertè pedunculatis; fructûs rostro complanato bidentato.

   97. *C. Hostiana*; 98. *C. fulva*; 99. *C. Hornschuchiana*; 100. *C. binervis*; 101. *C. lævigata*; 102. *C. distans*; 103. *C. punctata*; 104. *C. Michelii*; 105. *C. brevicollis*; 106. *C. depauperata*; 107. *C. sylvatica*; 108. *C. tenuis.*

8. Characteres ut in G. 7; sed fructûs rostro incerto.

   109. *C. ferruginea*; 110. *C. geniculata*; 111. *C. brevifolia*; 112. *C. spadicea*; 113. *C. sempervirens*; 114. *C. firma*; 115. *C. refracta*; 116. *C. fimbriata.*

9. Spicis racemosis; fructu pubescente.

   117. *C. clandestina.*

10. Spicis laxè racemosis; fructûs rostro teretiusculo brevi, vel membranaceo v. nullo.

    118. *C. panicea*; 119. *C. vaginata*; 120. *C. pilosa*; 121. *C. strigosa.*

11. Spicis longis densis pendulis.

    122. *C. pendula*; 123. *C. microcarpa.*

H. Spicis masculis pluribus; stigmatibus 3.

1. Fructu vix rostrato, aliquando supernè scabro sed haud undique pubescente.

   124. *C. glauca*; 125. *C. claviformis*; 126. *C. Genuensis*; 127. *C. lasiochlæna*; 128. *C. lanceolata*; 129. *C. acuminata*; 130. *C. longiaristata*; 131. *C. hispida.*

2. Fructu pilosissimo; rostro bifido.
   132. *C. filiformis*; 133. *C. evoluta*; 134. *C. hirta*.

3. Fructu haud piloso; rostro bifido.
   135. *C. secalina*; 136. *C. hordeiformis*; 137. *C. vesicaria*; 138. *C. ampullacea*; 139. *C. riparia*; 140. *C. Soleirolii*; 141. *C. nutans*; 142. *C. paludosa*.

On many of these species, and on other named species which Mr. Woods regards merely as varieties of one or other of the foregoing, the paper contains numerous observations. Of the following species the descriptions are not sufficiently complete to allow of the author placing them: *C. alopecurus*, Lap.; *C. juncoides*, Presl; *C. costata*, Presl; *C. furcata*, Lap.; *C. manostachys*, Spr.; *C. fusca*, All.; *C. nesliaca*, Suter; *C. Bastardiana*, DeC.; and *C. badia*, Pers.

June 18.—The Lord Bishop of Norwich, President, in the Chair.

Read a notice "On the Economy of the Order *Strepsiptera*." By John Curtis, Esq., F.L.S. &c.

Read also a memoir "On the Muscles which move the Tail and Tail-coverts of the Peacock." By G. C. Heming, Esq., M.D., F.L.S. &c.

Dr. Heming first refers to the mechanism by which the elevation of the feathers of birds in general is effected, either by a contractile power of the *cutis vera*, or by various modifications of subcutaneous muscles analogous to the *panniculus carnosus* of certain *Mammalia*; and then proceeds to the more immediate subject of his paper, the motions of the tail and train of the peacock, in which the apparatus for this purpose is far more complicated than in any other bird. This apparatus consists of two parts; the one intended for raising the caudal vertebræ and the feathers inserted into the groove of the last vertebra, and the other confined to the movements of the upper tail-coverts. As regards the former, Dr. Heming adopts, with little modification, the description of the muscles of the tails of birds given by Cuvier; the latter he describes in the following terms:—

"Upon the *sacro-coccygeal* muscle, which is exceedingly large and powerful in this bird, there is placed a mass of cellular substance somewhat of a triangular shape, measuring about five inches at the base, and each lateral line extending from the base to the apex about six inches; the base is situated towards the tail, and extends in this direction almost as far as the last caudal vertebra; thus there is not the space of an inch between the quills of the upper tail-covert and those of the true tail, while the apex of the triangular mass extends nearly to the lumbar extremity of the sacrum; it is wider than the muscle upon which it lies, and extends over it at each side full half an inch. This triangular mass is much thicker below than above: here it is full three-quarters of an inch thick, whilst at the apex it is not half this thickness. It is covered on its sacral surface by a thin fascia, and is connected to the muscle beneath it by loose cellular texture, which can be easily broken down by the handle of a

scalpel; but it has a membranous and closer connection, and towards its base it is more intimately attached by muscular fibres proceeding from the elevator muscles beneath, which are lost in the fascia covering its sacral surface.

"The quills of the upper tail-covert are inserted obliquely into this triangular mass of cellular substance, each quill having its peculiar capsule, which seems to be formed of condensed cellular membrane: between each quill there are small muscles, the fibres of which run in parallel lines extending from one quill to the other; and besides these muscles there are other small ones, the fibres of which run obliquely in such a direction as somewhat to resemble the letter V; the interstices of these muscles are filled with cellular substance.

"By the powerful action of the *sacro-coccygeal* and the *sacro-supracaudal* muscles, the true tail is elevated, and at the same time the upper tail-covert is raised perpendicularly and supported by the proper tail, and perhaps the swelling of these muscles in their contraction exerts some influence in spreading the feathers of the upper tail-covert. The principal agents in this office are the small muscles situated between each quill, by the contraction of which the quills are brought closer together, and consequently the opposite ends of the feathers are proportionately separated from each other. The small muscles of which the fibres diverge have not only the power of contributing, by their contraction, to the spreading of the feathers of the upper tail-covert, but they exert considerable influence in raising the feathers perpendicularly. There can be no doubt also, that the slips of muscular fibres coming from the *sacro-coccygeal* and *sacro-supracaudal* muscles exert their influence in the same office.

"Although these small muscles are very powerful, they would be quite inadequate, alone, to the office of raising perpendicularly, spreading the feathers and maintaining them for any considerable time, were it not that the feathers of the upper tail-covert are partly raised and maintained in this position by the elevation of the true tail."

The paper was accompanied by coloured drawings, representing in detail the muscular apparatus in the tail of the Peacock.

Read also a memoir "On the Solid Vegetable Oils." By Edward Solly, Jun., Esq., F.R.S., F.L.S. &c.

Mr. Solly commences his paper by referring to the usual division of oils into three classes, the fat, the drying and the volatile. The fat oils vary in their properties according to the relative proportions which they contain of Elaine or fluid oil and of Stearine or solid oil; those which contain much of the former being fluid at ordinary temperatures, while those which contain a larger quantity of stearine are solid under ordinary circumstances and constitute the class of Tallows or Butters. Of these the vegetable kingdom affords a very considerable number; and Mr. Solly having recently received specimens of several, has collected in the present paper a large amount of information concerning them, to which he has added his own observations. He arranges the Vegetable Butters or Tallows

according to the botanical affinities of the plants by which they are produced, and enumerates the principal among them as follows :—

1. *Theobroma Cacao*, L., and several other species of *Theobroma*.
2. *Vateria Indica*, L.

This tree (the Tallow-tree of Canara) is remarkable for producing at the same time an excellent resin resembling copal and a solid fat or tallow, suitable for the manufacture of candles. Mr. Solly has examined several specimens of the oil, which all agree in general characters with Dr. Babington's description, published in 1825, but differ in some minor points. The peculiar fracture described by him does not always appear, and is probably modified by the rate of cooling and other circumstances.

3. *Pentadesma butyracea*, G. Don.
4. *Carapa Touloucouna*, Guill. and Perrott.
5. ——— *Guianensis*, Aubl.
6. *Stillingia sebifera*, Mich.

For seeds of the *Stillingia* and specimens of the tallow prepared from it, Mr. Solly is indebted to W. V. Hillyer, Esq., who received them from Mr. Lay, Her Majesty's Consul General in China. The tallow is pure white, has little or no smell, is harder than common tallow, melts at 100°, and consists of 70 parts of solid and 30 of fluid oil. Mr. Solly has found the seeds to contain two oils ; one a tallow resembling that just described, which is contained in the white cellular envelope of the seed ; the other a colourless or pale yellow oil, which exists in the kernel and is readily obtained by expression. This oil is fluid at all common temperatures, and it is evident that the properties of the tallow will vary greatly according as only one or both of these oils may be expressed.

7. *Bassia butyracea*, Roxb.

Of the Choree Butter, the produce of this tree, Mr. Solly has examined two specimens, the first presented to the Royal Asiatic Society by Sir R. Colquhoun in 1826, and the second brought over by Mr. Traill in 1834. Both samples were of a pure white colour and of the consistence of tallow, the older being rather harder and having a disagreeable rancid smell, while that brought over by Mr. Traill is at the end of ten years perfectly sweet and free from rancidity. The former contained 82 parts of stearine and 18 of elaine ; the latter 60 parts of stearine, 34 of elaine, and 6 of vegetable impurities. Both were easily saponifiable, forming beautiful white soaps.

8. *Bassia longifolia*, L.
9. —— *latifolia*, Roxb.
10. ——?? *Parkii*, G. Don.

Mr. Solly has examined a specimen of the butter of this tree presented by Dr. Stanger to Mr. Ward. It is of a white colour having a slight tinge of gray, and has hardly any taste or smell. Its consistence is nearly that of common butter ; it melts at 97° of Fahrenheit, and consists of 56 parts of solid and 44 of fluid oil.

11. *Laurus nobilis*, L., and other species of *Laurus*.

12. *Tetranthera sebifera*, Nees.
13. *Cinnamomum Zeylanicum*, Nees.
14. *Myristica moschata*, L.
15. *Virola sebifera*, Aubl.
16. *Cocos nucifera*, L., and probably other species of the genus.
17. *Elæis Guineensis*, Jacq., and other Palms, such as *Euterpe oleracea*, Mart., and *Œnocarpus distichus*, Mart.

Besides these Vegetable Tallows, obtained in considerable quantity and of known origin, Mr. Solly mentions two of unknown origin, the Minna Batta described by Dr. Thomson, and a green solid oil received by him from Bombay under the name of Kinknail; and enumerates various plants from which solid oils have been procured in small quantities, and the list of which might probably be enormously increased.

ZOOLOGICAL SOCIETY.

January 9, 1844.—Rev. John Barlow, M.A., F.R.S., Sec. R.I., in the Chair.

At the request of the Chairman, Mr. Gould called the attention of the Meeting to a new species of Bird from Western Australia, the habits of which he described thus:—The bird is an inhabitant of the close underwood of the country, never making its appearance in the open plains or woods, thus rendering it a matter of difficulty to procure a specimen; the only means of securing it being to lie concealed in the thicket until it hops in sight, within two or three yards of the observer.

The great peculiarity which distinguishes it from all others of the *Sylviadæ*, and marks it at once as a new genus and species, is the total absence of the vibrissæ or bristles at the base of the mandibles. From this fact, and its note being the loudest of all the inhabitants of the grove, Mr. Gould proposed the name of *Atrichia clamosa*.

Genus Atrichia.

Gen. Char.—*Rictus* omninò vibrissis carens. *Rostrum* æquè longum atque caput, ad latera compressum, mandibulæ superioris apice distinctè denticulato, gonyde a rictu acclivi exinde rostri lineam sequente; culmine altè in frontem ascendente; naribus permagnis operculo tectis, et sulco, ad basim mandibulæ superioris, positis. *Alæ* breves, rotundatæ, concavæ, primariis primis tribus gradatis, quartâ, quintâ, sextâ et septimâ inter se ferè æqualibus. *Cauda* longiuscula, rotundata, rachibus rigidis, pogoniis laxis, decompositis. *Tarsi* sic et *pedes* robusti, halluce cum ungue valido; digitis externis ferè coæqualibus.

Atrichia clamosa. *Atr. corpore superiore, alis, caudâque fuscis; singulis plumis, lunulis obscurè nigrescentibus, transversim notatis: remigum primorum pogoniis internis saturatè fuscis; caudâ guttatâ, non fasciatâ; gulâ pectoreque rufescenti-albis, notâ magnâ ad gulæ partem inferiorem; abdomine crissoque rufis.*

All the upper surface, wings and tail brown, each feather crossed

by several obscure crescent-shaped bars of dark brown; the inner webs of the primaries very dark brown, without markings, and the tail freckled instead of barred; throat and chest reddish white, with a large irregular patch of black on the lower part of the throat; flanks brown; abdomen and under tail-coverts rufous; bill horn-colour; irides dark brown; feet dark brown.

Total length, 7¾ inches; bill, ⅞; wing, 3; tail, 4; tarsi, 1.

Hab. Western Australia.

January 23.—William Horton Lloyd, Esq., in the Chair.

Dr. Templeton's memoir on some varieties of the Monkeys of Ceylon was then read:—

"The *Cercopithecus pileatus* ('Menageries,' *M. sinicus*, F. Cuv.) is the common small monkey of every part of the western and southern maritime provinces of Ceylon. It is readily distinguished from the Toque by the light tan hue of the face and the black margin of the lower lip. The male is more robust and not so playful as the female; both are easily tamed, and retain their gentleness and familiarity in old age. The figure in the 'Histoire des Mammifères' represents the animal much too stout, the tail rather short, the distinction of colour of the back and abdomen marked by a too well-defined line, and the hairs on the crown of the head not sufficiently copious, long or divergent. In other respects the figure is good. In that excellent little work the 'Menageries,' page 308, are these words: 'with the long hair of the head standing erect, like an upright crest.' This, applied to our animal, I have difficulty in comprehending; the hair on the head of the adult males and females being flattened down, strikingly divergent from a small central part, and in some instances slightly separated down the middle; but anything like an upright crest I have never yet seen. There are some slight distinctions of sex and age which it may be proper to note, remarking at the same time that the peculiarities, though obvious enough in the majority, are by no means constant, but shade into each other, especially in the domesticated animals. The adult male, as I have above remarked, has the hair of the crown flattened down, equally divergent in all directions, of the same colour and appearance as that of the back; that is, rather long, mouse-coloured close to the skin, yellowish brown, or in strong sunlight golden with a shade of chestnut at the tips. The face is light tan-coloured, with scattered black hairs: along the eyebrows a few stiff black hairs projecting straightforwards, and above these, and beneath the crowning tuft, a dark band of hair; the space about the ears whitish, ears fuliginous; lower lip with a broad black margin; conjunctiva black. Iris reddish brown, pupil black. Anterior surface of the trunk and inner side of the limbs pale. The hands are strong, fuliginous; the dorsum thinly covered with hairs, like those of the back. Tail thickish at the root, mouse-coloured, not diminishing to a point; apex light brown or grey; callosities tan-coloured, with the hair for about an inch surrounding them fuliginous; penis trilobed. The female has the legs and arms of a redder tint, the inside of the upper arms and broad

patches of the chest and belly indigo-blue, and the band across the forehead not usually dark, but of an orange-yellow. In the immature the hair of the crown is not much flattened down or so diverging, the face more old-fashioned and exquisitely comical, the tail nearly naked, and the cheeks, palms, soles and callosities, pale pinkish. I have nothing to add to the admirable description of the habits of the genus given in 'Menageries.' This and the Toque should unquestionably be separated from all other 'Macaques.'

"The *Loris gracilis* is very common in the lower country of the south and east of Ceylon. Mr. Baird's account leaves little to be said about it, as its timorousness and nocturnal habits afford little opportunity for watching it. I have had them several times, but have never been able to keep them for more than a few months; they soon begin to pine away and die. Their food consisted of very ripe plantains, rice, and such insects as abounded in the apartment. The last I had slept nearly all day with the nose resting against the lower part of the belly, as represented in the sketch; about dusk, if the room was perfectly quiet, it ventured about, crawling along the rails of the chairs with a very gentle movement, occupying nearly one-third of a minute in closing its hands on the parts of the furniture it grasped in succession, and moving its head from side to side with much grave deliberation; but when a spider or other insect came within its reach, its clutch at it was quick as lightning, and with equal rapidity it was conveyed to the mouth, so that I could only guess at what it had seized from knowing that insects abounded in the room. It was perfectly conscious of being watched, as I have occasionally detected it moving with considerable rapidity, but instantly assuming its ordinary slow movement when my eyes were directed towards it. It would not tolerate the familiarities which are mentioned by Mr. Baird; and Capt. Geale, 90th Light Infantry, remarked to me that it seemed particularly anxious to avoid having its hinder extremities touched, which is certainly the case. I never saw it search for 'Pediculi' among its hair, nor could ever detect any on its body after death. When approached it retired along the stick placed slantingly in the corner for its use, or along the back of the chairs with the usual deliberate movement, its great goggle eyes fixed immoveably on your face, or hands if held towards it, and with every expression of extreme fear. Its mouth appears so small and so little distensible, at least when alive, that I cannot imagine it capable of biting anything except it be of very small size; yet the natives universally assert that it destroys peacocks in the jungle, seizing them by the neck, which it clutches with such tenacity that the bird soon falls exhausted to the ground off its perch, or in its sudden flight attempting to escape its persecutor; and further, that having devoured the brains it leaves the rest of the body untouched. The sketch* is a good one, taken from life; but it must be remarked that the white streak between the eyes often extends a little backwards,

* The published figures give no idea of the animal; they all represent the snout much too long, the eyes too small, and the face not sufficiently broad and flat.

gradually disappearing about the level of the ears. The hair is very singular when the animal is alive; it resembles very soft close-packed wool, somewhat curled and arranged in little tufts, as the hair on the scalp of the negro, but extremely delicate; it soon loses this appearance after death if much handled, as is always the case in removing the skin.

"There are *no other species* of *Stenopidæ* in Ceylon."

Mr. Mitchell, on the part of Mr. Gould, communicated to the Society a new species of *Psophodes*, which he described as *Psophodes nigrogularis*.

Also an additional example of the genus *Amadina*, perhaps the loveliest of the tribe yet discovered, remarkable for the great beauty and singularity of the hues with which it is adorned, the breast being crossed by a broad band of lilac, a colour so rarely found in birds, that he does not recollect any example of the same tint. Mr. Gould has hitherto seldom adopted the practice of many naturalists, of naming new species from individuals connected with science; in this instance he has been induced to depart from his usual course, in order to pay a tribute of respect to the memory of the late Mrs. Gould, who assisted him so zealously and with such talent in his ornithological pursuits. For this bird, of most graceful form and delicate colour, he proposes the name of *Amadina Gouldiæ*.

Psophodes nigrogularis. *Psoph. corpore superiore olivaceo; inferiore cinereo apud latera fuscescente, abdomine medio albo; caudâ pallidè olivaceo-fuscâ, rectricibus quatuor externis apicem versus nigro vittatis, apicibus albis; guld nigerrimâ, strigâ albâ ab angulo mandibulæ inferioris tendente modò nigro inclusâ.*

Plumage of the upper surface olive; under surface ashy, passing into brown on the flanks and white on the centre of the abdomen; primaries brown; tail light olive-brown, the four lateral feathers crossed near the extremity with a band of black, and tipped with white; throat deep black, with a stripe of white from the angle of the lower mandible, just within the black; bill dark horn-colour; irides dark brown; feet dark horn-colour.

Total length, $6\frac{1}{4}$ inches; bill, $\frac{7}{8}$; wing, $3\frac{1}{8}$; tail, $4\frac{1}{2}$; tarsi, $1\frac{1}{8}$.

Hab. Western Australia.

This bird has all the characters of the *Psophodes crepitans* in the short and concave form of its wings and the rounded form of the tail, but differs in the absence or very slight development of the crest.

Amadina Gouldiæ. *Am. fronte, loris plumis auricularibus, et guld splendidè nigris; notâ ab oculis circum occiput et per latera colli tendente, ex ærugine viridi, gradatim cum flavido-viridi corporis superioris se commiscente; fasciâ per pectus latâ, lucidè lilacino-purpured; corpore inferiore cerino.*

Male.—Forehead, lores, ear-coverts and throat deep velvety-black; from behind the eye, round the occiput, and down the sides of the neck, a mark of verdigris-green, gradually blending into the yellowish green of the upper surface and wings; across the breast a broad band of shining lilac-purple, below which all the under surface is

shining wax-yellow; bill flesh-white at the base, tipped with blood-red at the point; feet fleshy.

Young Female.—Head grey; upper surface light olive; under surface pale buff; chin white; primaries and tail brown; irides dark brown.

Total length, $3\frac{3}{4}$ inches; bill, $\frac{3}{8}$; wing, $2\frac{1}{2}$; tail, $1\frac{1}{4}$; tarsi, $\frac{5}{8}$.

Hab. North-eastern portion of Australia.

Remarks.—The young of this species killed by Mr. Gilbert had the gape on each side ornamented with three excrescences about the size of the head of a moderate-sized pin, the upper and lower of which were of a bright indigo-blue, and the middle one of a very pale yellow, and on the roof of the mouth five small spots of purple, forming a crescent across to each angle of the gape.

February 13.—George Gulliver, Esq., in the Chair.

"Descriptions of new species of *Scalaria*, collected by Mr. H. Cuming, to be figured in the fourth part of Thesaurus Conchyliorum," by G. B. Sowerby, Jun., Esq.

Scalaria alata, Thes. Conch. part. 4. pl. 32. f. 10, 11. *Scal. testâ subventricosâ, lævi, umbilicatâ; anfractibus separatis; varicibus* 8 (*anfractu ultimo* 7), *latis, distantibus, laminatis, extantibus, posticè propè medium, obtusè angulatis; aperturâ ovali, margine subquadrato; colore inter varices, in medio anfractuum, fulvo vel castaneo.* Long. 0·95; lat. 0·50; ex. var. poll.

Hab. Catanauan, pr. Tayabas, ins. Luzon. H. Cuming legit. Found in sandy mud at eight to ten fathoms.

Scalaria fasciata, Thes. Conch. part. 4. pl. 32. f. 12, 13. *Scal. testâ subventricosâ, lævi, umbilicatâ; anfractibus separatis; varicibus* 7, *sublatis, distantibus, laminatis, extantibus, posticè propè suturam acutè angulatis; aperturâ parvâ; colore albo, fasciâ fuscâ latâ inter varices in medio anfractuum.* Long. 0·80; lat. 0·40 poll.

Hab. Catanauan, pr. Tayabas, ins. Luzon. H. Cuming legit.

Differing from *Sc. alata* in being a somewhat more elongated shell, in having the varices narrower, and their angle more elevated and more acute. The colour is lighter and the band more distinct. Found in sandy mud at eight to ten fathoms.

Scalaria marmorata, Thes. Conch. part. 4. pl. 32. f. 9. *Scal. testâ pyramidali, subventricosâ, lævi, umbilicatâ; anfractibus separatis, varicibus distantibus, laminatis, extantibus, continuis, propè medium obtusissimè angulatis; colore albo, fusco marmorato.* Long. 0·85; lat. 0·40 poll.

Hab. India.

We have no information as to the locality of this species, which differs from *Sc. alata* in having the angle of the varices very obtuse and nearer the centre of the whorl. The specimens are beautifully marbled with dull brown. Mr. Cuming's collection.

Scalaria replicata, Thes. Conch. part. 4. pl. 32. f. 23, 24. *Scal.*

testâ brevi, subventricosâ, lævi, umbilicatâ, anfractibus separatis; varicibus 7 distantibus, laminatis, extantibus, continuis, validè replicatis, propè suturam angulatis; colore albo. Long. 0·60; lat. 0·32 poll.

Hab. Ins. "Lord Hood's." H. Cuming legit.

Found on coral reefs; shorter than the preceding and having the varices folded backwards.

Scalaria hyalina, Thes. Conch. part. 4. pl. 32. f. 21, 22. *Scal. testâ tenui, glabrâ; anfractibus latè separatis, angustis; varicibus distantibus, laqueatis, extantibus; colore albo.* Long. 0·40; lat. 0·21 poll.

Hab. Ins. Catanauan et Batangas, ins. Luzon, Philippinarum. H. Cuming legit.

This small species has the whorls widely separated from each other and the varices few, distant, and beautifully fluted. Found in sandy mud at eight to ten fathoms.

Scalaria laxata, Thes. Conch. part. 4. pl. 32. f. 8. *Scal. testâ tenui, lævi; anfractibus latè separatis, varicibus numerosis, subregularibus, laminatis, simplicibus; aperturâ ovali; colore albo.* Long. 0·76; lat. 0·37 poll.

Hab. Ins. Catanauan, pr. Tayabas, ins. Luzon, Philippinarum. H. Cuming legit.

The whorls are separated, as in *Sc. hyalina*, but the varices are numerous and simple. Found in sandy mud at eight to ten fathoms.

Scalaria pyramidalis, Thes. Conch. part. 4. pl. 32. f. 4. *Scal. testâ pyramidali, acuminatâ, lævi; anfractibus separatis; varicibus extantibus 9 subcrenulatis, propè suturam in angulum acutum productis, ad suturam junctis; aperturâ ovali; labio interno crasso; colore albo.* Long. 1·20; lat. 0·50 poll.

Hab. Ins. Caminguing, Philippinarum. H. Cuming legit.

Taken in sandy mud at thirty fathoms.

Resembling *Sc. communis*, but more pyramidal in form, more tapering towards the apex, and the somewhat more laminated and projecting varices have a sharp angle near the centre. The most perfect specimen is in the collection of the Rev. J. F. Stainforth.

Scalaria Philippinarum, Thes. Conch. part. 4. pl. 32. f. 1, 2, 3. *Scal. testâ elongatâ, acuminatâ, lævi; anfractibus numerosis, paululùm separatis; varicibus distantibus, tenuibus, obliquis, supernè vix angulatis, ad suturam junctis; colore inter varices pallidè fulvo, vel castaneo-nigricante. Variat colore albo.* Long. 0·95; lat. 0·27 poll.

Hab. Catanauan, pr. Tayabas, ins. Luzon, Philippinarum; H. Cuming legit: et Amboyna, legit R. B. Hinds.

An elongated shell, the principal variety of which is of a chestnut colour between the varices. Found in sandy mud at eight to ten fathoms.

Scalaria aculeata, Thes. Conch. part. 4. pl. 32. f. 35, 36, 37. *Scal. testâ pyramidali, lævi, acuminatâ; anfractibus vix separatis; varicibus laminatis, reflexis, anticè subrotundatis, propè suturam*

in dentem acutum productis, ad suturam plicatim junctis. Variat varicibus crassis, colore albo, vel pallidè fulvo. Long. 0·56; lat. 0·22 poll.

Hab. Hong Kong, China, et Macassar, Malacca, Amboyna; R. B. Hinds legit: ad Bais, ins. Negros, et ad Catanauan, ins. Luzon; H. Cuming legit.

Some specimens were taken at Bais, isle of Negros, in coarse sand at six fathoms.

Scalaria gracilis, Thes. Conch. part. 4. pl. 32. f. 33, 34. *Scal. testâ aculeatâ simili, sed multùm graciliori.*

Hab. Dumaguete, ins. Negros, Philippinarum. H. Cuming legit.

So much narrower in proportion to its length than the preceding species as to justify the distinction, which has not been made without hesitation. Found in coarse black sand at seven fathoms.

Scalaria Mitræformis, Thes. Conch. part. 4. pl. 32. f. 30. *Scal. testâ pyramidali, lævi, tenui, acuminatâ; anfractibus vix separatis; varicibus distantibus, laminatis, extantibus, angulatis, ad angulum in dentem acutum elevatis; colore albo.*

Hab. Guacomayo, Amer. Merid. H. Cuming legit.

The only specimen we have seen is in Mr. Cuming's collection; it bears a very near resemblance to the common West Indian species named *Sc. muricata* by Kiener, from which it differs in having the angle of the varices elevated into a tooth or point. It is also a thinner shell, with the laminated varices narrower. Found in sandy mud at a depth of eleven fathoms.

Scalaria venosa, Thes. Conch. part. 4. pl. 33. f. 72, 73. *Scal. testâ pyramidali, lævi, acuminatâ, imperforatâ; anfractibus prominentibus vix contiguis; varicibus* 12, *proximis, crassis, in medio validè reflexis, tumidis, posticè angulatis, propè suturam subangustatis; aperturâ rotundatâ, colore inter varices pallidè fulvo.*

Hab. Nevis, Indiâ occidentali.

Remarkable for the shape of the varices, which are turned backward and rounded, giving the appearance of tumid veins; the interstices, which are narrow, are of a delicate fawn-colour.

Scalaria Lyra, Thes. Conch. part. 4. pl. 33. f. 38, 39; pl. 34. f. 81, 82. *Scal. testâ ventricosâ, acuminatâ; anfractibus prominentibus, rapidè crescentibus, propè suturam elevatis, suturâ profundâ distinctis; varicibus tenuibus, numerosissimis, obliquis; aperturâ magnâ, ovali; labio interno tenui, obliquo; umbilico parvo; colore pallidè fulvo, fasciis duabus fuscis plus minusve distinctis.*

Hab. Ins. Masbate, Philippinarum. H. Cuming legit.

A beautiful species, with ventricose whorls, which are distinguished by a very deep suture. The varices are thin, close, regular and oblique. The colour is pale brown or dull white, with two bands of deeper or paler brown. Found in sandy mud at five fathoms.

Scalaria dubia, Thes. Conch. part. 4. pl. 33. f. 41. *Scal. testâ ventricosâ, acuminatâ, minutè striatâ; anfractibus subprominentibus, suturâ profundâ distinctis, rapidè crescentibus; varicibus numerosis, paululùm expansis; aperturâ magnâ, subovali; labio*

externo tenui, labio interno subexpanso; umbilico parvo; colore albo.

Hab. Ticao, Philippinarum. H. Cuming legit.

The imperfect specimen in Mr. Cuming's collection is the only one which we have seen. Taken on reefs.

Scalaria irregularis, Thes. Conch. part. 4. pl. 33. f. 40, 60. *Scal. testâ ventricosâ, acuminatâ, lævi; anfractibus contiguis, rotundatis, gradatim crescentibus; suturâ distinctâ; varicibus tenuibus, numerosis, inæqualibus, nonnullis magnis; aperturâ obliquè ovali; umbilico mediocri; colore albo.*

Hab. Catanauan, pr. Tayabas, ins. Luzon, Philippinarum. H. Cuming legit.

The varices of this species are rather thin and numerous, with sharp edges; some are much thicker than others. Found in sandy mud at eight to ten fathoms.

Scalaria imperialis, Thes. Conch. part. 4. pl. 33. f. 56, 57. *Scal. testâ pyramidali, ventricosâ, acuminatâ, lævi; anfractibus magnis, rotundatis, contiguis, propè suturam elevatis, gradatim crescentibus, suturâ profundâ; varicibus numerosis, simplicibus, versùs apicem tenuibus, gradatim crescentibus, in ultimo anfractu crassis, nonnullis duplicatis et triplicatis; aperturâ magnâ, ovali; umbilico magno; colore inter varices pallidè fulvo, fasciis binis fuscis in medio anfractûs ultimi purpureo confusis.*

Hab. Swan River.

A beautiful pyramidal shell, with numerous regular varices, which in the upper whorls are thin, but in the last whorl are thicker, some of the last being doubled. The colour between the varices is dull fawn, with two bands, which in the last whorl are blended with purple.

"Description of new species of *Mytilacea*, &c.," by Sylvanus Hanley, Esq.

Modiola Metcalfei. *Mod. testâ subtriangulari, oblongâ, ventricosâ, posticè albo-cærulescente, anticè purpureâ, obsoletè barbatâ, epidermide flavo-fuscescente indutâ; epidermide, prope marginem dorsalem, subelongatum, valdè elevatum, et ad extremitatem posticam brevem, angustam, sursùmque prominentem, nitoris experte; costâ umbonali, prope ad nates purpureas, acutas, obtusè subcarinatâ; angulo dorsali distincto, elevato; margine antico subrecto, nunquam incurvato; extremitate anticâ sublinguiformi, rotundatâ; margine ventrali in medio incurvato, posticè valdè obliquo; superficie internâ anticè purpureo tinctâ.* Long. 1·70; lat. 3·0 poll.

Hab. ——? Mus. Cuming, Hanley.

The more prominent characters are the compressed and very distinct dorsal angle, the purple beaks, the elevated umbonal ridge, and the absence of all glossiness from the narrow strip of epidermis which adjoins the ligamental edge, and from that lunule-shaped portion which forms the posterior extremity and curves upwards to the beaks. I have named it in honour of one of our most scientific collectors, W. Metcalfe, Esq., of Lincoln's Inn.

Modiola striatula. *Mod. testâ elongato-oblongâ, angustâ, subarcuatâ, subcylindraceâ, epidermide olivaceâ indutâ; laters postico*

brevi radiatim costulato, costis paucis, distantibus; latere antico producto, tenuissimè radiatim striato, striis ad extremitatem anticam elevatis, divaricatis; aréâ intermediâ lævigatâ; margine dorsali subrecto, vix elevato, marginis antici convexi longitudinem æquante; margine ventrali incurvato; angulo dorsali inconspicuo; umbonibus planulatis; superficie internâ purpureâ; cardine, ad extremitatem ligamenti, crenato. Long. 0·60; lat. 1·40 poll.

Hab. Batangas, insularum Philippinarum. Mus. Cuming, Hanley.

Closely similar to *plicata* in shape, sculpture, and the colour of its epidermis; the rich purple of its interior, its smaller size, and the greater delicacy of its markings, at once proclaim its distinctness. It is usually rayed anteriorly with narrow interrupted black streaks.

Modiola subramosa. *Mod. testâ oblongo-angustatâ, subventricosâ, posticè lævi, anticè costatâ, epidermide flavo-rufescente indutâ; costis planulatis, radiantibus, furcatis, subramosis, distantibus; margine cardinali brevissimo, subrecto; margine antico primum incurvato et vix declivi, deindè convexo et abruptè declivi; ventrali incurvato; extremitate anticâ subbiangulatâ, valdè compressâ; cariná umbonali conspicuâ, in junioribus acutâ; superficie internâ, anticè purpureo tinctâ; cardinis extremitatibus crenatis; angulo dorsali parùm elevato.* Long. 0·55; lat. 1·30.

Hab. Cagayan, pr. Misamis, insulæ Mindanao.

Mus. Cuming, Hanley.

Closely allied to *M. sulcata* of Lamarck, but in that species the rib-like striæ are crowded and numerous. The beaks are all but terminal, acute, and incurved.

Modiola Philippinarum. *Mod. testâ ovato-oblongâ, tumidâ, lævi, anticè barbatâ; epidermide nitidâ, fulvo-castaneâ, in medio pallescente, indutâ; angulo dorsali distincto, rotundato; margine dorsali elevato, subelongato, convexiusculo; antico breviore, subrecto, subincurvato; extremitate anticâ latâ, rotundatâ; posticâ brevi, prominulâ, nitore epidermidis orbatâ; natibus angustis, conspicuis; carinâ umbonali prominente; superficie internâ, anticè atropurpureâ.* Long. 2·20; lat. 4 poll.

Hab. Zebu, Philippinarum. Mus. Cuming, Hanley.

Possessing a sort of general resemblance to *M. Modiolus*, its more elongated hinge-margin, and the greater projection of its hinder extremity, suffice to distinguish it from that species. The rich internal colouring of its anterior slope, and the peculiarity of the lunule-like posterior space, which is destitute of lustre, form the principal features of its characteristics.

Modiola biradiata. *Mod. testâ oblongo-trigonâ, lævigatâ, ventricosâ; sub epidermide sordidè fulvâ, anticè purpureo tinctâ, deindè radio albido ornatâ, areâque posticâ pallidè brunneâ et radio pallidiore ad extremitatem ejus prominulam notatâ; margine cardinali elevato, subrecto, elongato; angulo dorsali distincto; margine ventrali medio incurvato; antico subrecto, elongato, paululùm retuso; extremitate anticâ productâ, rotundatâ; carinâ umbonali prominente; superficie internâ anticè purpureâ.* Long. 1·25; lat. 2·50.

Hab. ——? Mus. Metcalfe.

The glossy epidermis, which is apparently destitute of any distinct beard, although sufficiently rough on the anterior slope to render its occasional presence not improbable, ceases entirely just before reaching the hinge-margin, leaving a long narrow strip of dull dusky purple. Its general shape closely resembles *albicosta* of Lamarck, with which briefly-described species it has doubtless been confused by the majority of collectors. That species, however (whose original type I carefully examined at Paris), differs both in other respects and by the clear fawn-colour of its epidermis.

Modiola strigata. *Mod. testâ parvâ, tenuissimâ, subdepressâ, oblongâ, virescente, strigis undulatis fusco-purpureis, irregulariter pictâ; latere antico radiatim striato, dilatato, anguli dorsalis experte; latere postico brevissimo, longitudinaliter costulato; margine cardinali elongato, convexo; antico arcuato; ventrali medio convexiusculo.* Long. 0·25; lat. 0·50 poll.

Hab. Sibango, isle of Zebu; in ten fathoms, sandy mud. Mus. Cuming, Hanley.

For this and the succeeding species we are indebted to the researches of H. Cuming, Esq., in the Philippine Islands. The shell, though small, is far from inelegant, and unites the contour of the British *discrepans* with the zigzag markings of the African *Owenii*.

Modiola arcuatula. *Mod. testâ elongatâ, angustâ, subarcuatâ, compressâ, lævigatâ, tenuissimâ, anguli dorsalis experte; sub epidermide fulvo-viridescente, strigis undulatis, purpureo-brunneis, anticè transversim ornatâ; costâ umbonali pallidâ, prominente; margine cardinali elongato, antico brevi, valdè arcuato; ventrali incurvato; extremitate anticâ dilatatâ, rotundatâ; posticâ rotundatâ, prominente, valdè attenuatâ, costellis paucis radiatâ; superficie internâ, anticè purpureo tinctâ.* Long. 0·50; lat. 1·50.

Hab. Singapore, at low water. Mus. Cuming, Hanley.

Belonging to that division of *Modiolæ* which is destitute of any dorsal angle, it is remarkable for its narrow sickle-shaped contour, and the few narrow ribs of its posterior extremity.

Modiola sordida. *Mod. testâ oblongâ, ventricosâ, epidermide olivaceâ indutâ; areâ anticâ lamellis concentricis, membranaceis, cinereo-fulvis, vestitâ; lamellarum margine barbato; costâ umbonali prominente; angulo dorsali obtusissimo; margine cardinali breviusculo, parùm elevato; antico elongato, in adultis retuso; ventrali incurvato; extremitate posticâ brevissimâ, obtusissimâ; superficie internâ, anticè purpureo tinctâ.* Long. 1·25; lat. 2·65.

Hab. ——? Mus. Metcalfe.

The shape of this ugly species closely resembles that of *M. Modiolus*, but the colour of its epidermis and its peculiar beard will easily distinguish it. This latter appendage is composed of a dull-looking, membranaceous, ashy-coloured substance, formed of lamellæ, which near the ventral edge curl upwards towards the beaks; the edges are here and there fringed with elongated lanceolate filaments. The umbonal ridge is edged posteriorly by a paler streak, which is not sufficiently distinct however to be termed a ray.

Lithodomus canaliferus. *Lit. testâ elongato-oblongâ, subcylindraceâ, rectâ, lævigatâ, epidermide castaneâ sub tegmine calcareo indutâ; tegmine in lineis elevatis, crassis, radiantibus, supernèque opertis, anticè ordinato; sulco obliquo ex umbonibus ad marginem ventralem subrectum et leviter convexiusculum, anticè decurrente; margine cardinali subincurvato, elongato, leviter elevato; antico dorsali, subrecto; extremitate anticâ obtusissimâ, posticâ vix angustatâ.* Long 0·65; lat. 2.

Hab. Found in rocks, isle of Zebu. Mus. Cuming, Hanley.

At once recognisable by the extraordinary arrangement of its calcareous coating over the umbonal slope, on which are placed three oblique covered canals, formed by four radiating ridges, with another coating of calcareous matter spread above them, leaving the apertures distinctly visible at the anterior extremity.

Lithodomus plumula. *Lit. testâ* L. canalifero *simillimâ, sed extremitate anticâ minus obtusâ; tegmine calcareo antico, crassiore, atque in parietibus confertis, subparallelis ordinato; parietibus corrugatis et (plumulæ haud dissimilibus) versus marginem ventralem et marginem anticum utroque latere radiantibus.* Long. 0·75; lat. 2·35.

Hab. Panama, in *Spondyli*. Mus. Cuming, Hanley.

Were it not for the calcareous coating of the umbonal ridge, this curious shell could scarcely be discriminated from the preceding species. This coating is of a cellular structure, and is composed of numerous rather elevated narrow ridges, which slope forward, and so radiate on either side from the middle as to remind us of a ruffled feather.

Mytilus granulatus. *Myt. testâ parvâ, ovali-triangulari, tumidâ, crassâ, radiatim costulatâ; costis distinctis, angustioribus, rotundatis, granulatis, plerumque bifurcatis; epidermide ochraceo-flavescente; margine cardinali brevi, convexo; antico valdè arcuato, dilatato; ventrali subincurvato; natibus maximè incumbentibus divaricatis; angulo dorsali rotundato; latere postico planulato, valdè tumido; superficie internâ albâ, submargaritaceâ; margine interno crenulis dentato.* Long. 0·50; lat. 0·75.

Hab. Valparaiso, under stones at low water. Mus. Cuming, Metcalfe, Hanley.

A species easily to be distinguished by its narrow granulated ribs (which become still narrower on the flattened posterior slope) and by the peculiarity of its beaks, which slope so greatly back as to cause the shell to appear blunt and almost truncated at that part. The hinge, as in most of this genus, is provided with two teeth in one valve, and one in the other.

"A description of new species of recent Shells," chiefly from the collection of W. Metcalfe, Esq.

Amphidesma scabrum. *Amph. testâ obovatâ, convexâ, solidâ, subæquilaterali, albâ, lineis rubro-castaneis radiatâ, concentricè lamelliferâ; lamellis brevibus, tenuibus confertis, interstitiis minutis-*

simè longitudinaliter striatis; latere antico subangulato, postico rotundato; margine ventrali arcuato, anticè sinuato; intùs pallidè aurantiá, lunulá, foveáque ligamentali rubro-purpureá. Long. 0·2; lat. 2½ poll.

Hab. Boljoon, insula Zebu. Mus. Cuming, Metcalfe.

Amphidesma Zebuense. *Amph. testá obliquè ovatá, solidá, valdè inæquilaterali, convexiusculá, albidá, radiis pallidè rubris ornatá, concentricè lamelliferá; lamellis brevibus confertis, interstitiis striá elevatá concentricá, plerumque notatá; latere antico brevi, rotundato; margine postico incurvato, ventrali valdè arcuato; intùs albá, ad umbones rubro biradiatá.* Long. 1¾; lat. 2.

Hab. Zebu, Philippinarum. Mus. Metcalfe, Cuming.

This elegant shell bears some resemblance to the preceding, but its shape alone would be sufficient to distinguish it. The colouring matter seems to be deposited only on the lamellæ. The lunule is rather large for this genus.

Glauconome virens; Solen virens, Linn. Syst., p. 1115. *Gl. testá oblongo-elongatá, subtenui, valdè inæquilaterali, ad umbones tumidá, albidá; epidermide tenui, viridi, vix nitidá, obsoletè longitudinaliter rugosá, vestitá; latere postico rotundato; antico producto, acuminato, subrostrato, transversim rugoso; margine ventrali vix arcuato, leviter in medio incurvo; intùs albidá.* Long. 1; lat. 2¼ poll.

Hab. Java and China?

This extremely rare shell, concerning which Mr. Dillwyn remarks that no subsequent author has recognized it, still exists in Linnæus' cabinet, and with the exception of a few young shells in the collection at the Chinese Exhibition, I have never met with any specimens elsewhere.

Odostomia eulimoides. *Od. testá oblongo-turritá, niveá, lævi, politá, subpellucidá; anfractibus quinque, convexiusculis, ultimo spiram æquante; suturá distinctá; aperturá oblongá, lævi, plicá dentiformi labii interioris in medio; labio exteriore ad basim subeffuso, margine vix convexo.* Long. 0·18; lat. 0·08 poll.

Hab. Guernsey.

Odostomia Rissoides. *Od. testá oblongo-conicá, albá, lævi, nitidá; anfractibus quinque, convexiusculis, ultimo spiram æquante; suturá distinctá; aperturá duplicem quintam partem totius longitudinis æquante, plicá columellari pænè obsoletá; labio exteriore intùs lævi.* Long. 0·18; lat. 0·09 poll.

Hab. Guernsey.

Allied to the last, but the mouth is far smaller in proportion to the length of the spire. The plait lies so far back on the columella as not to be discerned by the careless observer.

Odostomia turrita. *Od. testá turritá, niveá, lævi, nitidá; anfractibus quinque, convexiusculis; suturá obliquá; aperturá subreniformi, quartam partem totius longitudinis æquante; plicá dentiformi e parte superiore columellæ prominente.* Long. 0·12; lat. 0·04.

Hab. Guernsey.

The delineations of these last three species will appear in the 'British Marine Conchology.' The shells are from the cabinet of W. Metcalfe, Esq., and were procured by him on one of the islets near the coast of Guernsey.

February 27.—Professor Owen in the Chair.

Mr. Lovell Reeve described seven new species of *Glauconome*, a genus of fluvio-marine Mollusks of the family *Solenacea*.

The genus *Glauconome* was introduced some years since by Mr. J. E. Gray in his 'Spicilegia Zoologica,' with the description of a single species collected by John Reeves, Esq. in China. Another species appears to have been described by the great author of the 'Systema Naturæ' under the title of *Solen virens*, the original examples of which are still preserved in the collection of the Linnæan Society; and I have now the pleasure of exhibiting seven new species, which by their characters and habits add materially to the generic importance of the group.

The Glauconomes are of a light semi-perlaceous structure, covered with a thin light green horny epidermis, which in some species is very peculiarly wrinkled or shrivelled, and inflected over the margin, and their hinge is composed of three irregular forked teeth in each valve, some of which are generally bifid. They live in brackish water (in the mud) in the mouths of rivers at their confluence with the sea, and have only been found as yet in the Eastern hemisphere. Out of nine species with which we are now acquainted, the localities of eight are known to be as follows: one inhabits the rivers of China; one the Ganges and probably other rivers of India; three inhabit certain rivers running into the bay of Manila; and three, certain small rivers in the islands of Zebu, Negros and Luzon, of the Philippines; the last six having been collected in those particular localities by H. Cuming, Esq.

The place selected by Mr. Gray for the genus *Glauconome* in the natural system was in his family of the *Veneridæ*; it appears to me, however, to exhibit a much stronger affinity with the *Solenacea*; in my arrangement in the 'Conchologia Systematica,' I referred it to that family, and I am happy to say that the propriety of this removal has been subsequently confirmed.

The following are descriptions of the seven new species:—

1. Glauconome rugosa. *Glauc. testâ elongato-oblongâ, rugosâ, circiter umbones plus minusve erosâ, lateribus rotundatis; epidermide peculiariter corrugatâ, latere postico subobsoletè angulato.*

Conch. Icon. pl. 1. f. 4. *a* and *b*.

Hab. The mouths of rivers running into the bay of Manila.

This species, which is by far the largest of the genus, presents a very peculiar arrangement of the epidermis. Over about one-third of the length of the shell from the posterior extremity, the epidermis lies in narrow ridges parallel with the lines of growth; these ridges are then suddenly directed towards the umbones, and become dispersed over the remaining portion of the shell in the form of shrivelled wrinkles scattered in the contrary direction.

2. Glauconome straminea. *Glauc. testâ subelongato-ovatâ, circiter umbones erosâ, latere antico rotundato, postico subattenuato, leviter angulato, rotundato; epidermide nitidâ, viridescente-stramineâ, angulum super corrugatâ.*

Conch. Icon. pl. 1. f. 2.

Hab. Mouths of rivers running into the bay of Manila.

A light delicate straw-coloured shell, slightly angulated on the posterior side, with the epidermis lying on the angle in wrinkles.

3. Glauconome radiata. *Glauc. testâ oblongo-ovatâ, compressiusculâ, corneâ; purpureo-radiatâ; epidermide viridescente prope marginem indutâ, lateribus rotundatis, postico subacuminato.*

Conch. Icon. pl. 1. f. 3.

Hab. Mouth of a small river at San Nicolas, island of Zebu, Philippines.

This is a very pretty species, vividly rayed inside and outside with violet-purple.

4. Glauconome corrugata. *Glauc. testâ elongato-ovatâ, subtilissimè striatâ, circiter umbones erosâ, lateribus rotundatis, postico acuminato-angulato; epidermide angulum super corrugatâ, intùs vividè purpureo-radiatâ.*

Conch. Icon. pl. 1. f. 6.

Hab. Mouths of rivers running into the bay of Manila.

The posterior side of this species is more elongately angled than that of any other; the epidermis is wrinkled over the posterior half of the shell, and the interior is vividly rayed with purple.

5. Glauconome angulata. *Glauc. testâ elongato-oblongâ, striatâ, circiter umbones plus minusve erosâ, latere antico rotundato, postico angulato, carinâ obtusâ ab umbonibus ad marginem decurrente.*

Conch. Icon. pl. 1. f. 5.

Hab. Mouth of a small river at Jinigaran, island of Negros, Philippines. Rather a dingy, short, angulated species.

6. Glauconome curta. *Glauc. testâ ovatâ, curtâ, tenui, subtilissimè striatâ, ad umbones paululùm erosâ, lateribus rotundatis, intùs cæruleo-carneo tinctâ.*

Conch. Icon. pl. 1. f. 7.

Hab. Mouth of a river in Agoo, province of Pangasinan, island of Luzon, Philippines.

A very delicate species, with a fine smooth silken epidermis, short, and but very faintly angulated on the posterior side. Interior rich purple.

7. Glauconome cerea. *Glauc. testâ oblongo-ovatâ, pallidè stramineâ, subtilissimè striatâ, lateribus rotundatis, postico subangulato-attenuato.*

Conch. Icon. pl. 1. f. 8.

Hab. Mouth of the Ganges.

A very delicate pale straw-coloured shell, with a smooth silken epidermis.

BOTANICAL SOCIETY OF LONDON.

June 7, 1844.—J. Reynolds, Esq., Treasurer, in the Chair.

Specimens of *Œnanthe peucedanifolia* and *Œ. pimpinelloides* were exhibited, accompanied by notices of their distinctive characters and habits, by Edwin Lees, Esq., F.L.S.

Much uncertainty and confusion having prevailed among British authors and distributors in regard to the distinctions between these species, the views of Mr. Lees, founded on good opportunities for observation, are deserving of particular attention. The following condensed abstract will explain the conclusions formed by this botanist.

First. *Œ. peucedanifolia* always grows in wet places, and is found both by salt and fresh water; while *Œ. pimpinelloides* is found in dry ground only.

Secondly. The characters derived from the form of the radical leaves, and the presence or absence of an involucrum, will not prove sufficient to prevent confusion; but the rounded tubercles upon the roots of *Œ. pimpinelloides* will readily serve to distinguish that species from *Œ. peucedanifolia*, in which the tubercles are elongate and sessile.

Thirdly. There is some difference in the fruit of the two species, though the materials in the possession of Mr. Lees are not sufficient to state this with precision and certainty.

Mr. Lees thus attaches the first importance to the form of the root as a distinctive character, and the circumstance should instruct collectors to be mindful of the value of the root.

Specimens collected by Mr. Lees afforded the principal reason for retaining *Œ. pimpinelloides* as a British species in the 'London Catalogue of British Plants,' in preference to the adoption of Mr. Babington's change to *Œ. Lachenalii*; and one of the same specimens communicated to Mr. Ball induced that excellent botanist to admit *Œ. pimpinelloides* as well as *Œ. Lachenalii* among the indigenous species. Three species, not two only, should therefore now be looked for, and the confusion and uncertainty may thus be removed.

Most of the specimens hitherto sent to the Society have proved quite useless through the absence of roots and fruit, but it is earnestly requested by the Council that contributors will collect specimens with root and fruits from as many localities as possible.

Some highly interesting examples of the Irish Saxifrages, belonging to Haworth's genus *Robertsonia*, were exhibited from Mr. Andrews, who had obligingly sent living plants as well as dried specimens. Two of the specimens were sent in record of the fact lately doubted or denied by the accurate Mr. C. C. Babington, that the Pyrenean forms of *S. umbrosa* and *S. Geum* (with crenate leaves) are certainly native in Ireland; the specimen of *S. Geum*, indeed, being considered "even more obtusely crenate than Mr. Babington's figure (No. 8) from the Pyrenean plant." These specimens were collected "this year, from the mountains to the south of Brandon Mountain, county of Kerry."

S. hirsuta is considered by Mr. Andrews to be a hybrid form be-

tween *S. Geum* and *S. umbrosa*, "as many of the varieties present characters leaning either more or less to the one species or the other."

S. elegans is deemed by Mr. Andrews to be simply a variety of *S. umbrosa*. And after careful examination of the forms of *S. hypnoides*, he is now "satisfied that *S. affinis, incurvifolia, hirta* and *palmata* are all mere varieties, or indeed barely deserving the name of varieties."

Read "A Synoptical View of the British Fruticose *Rubi*, arranged in groups, with explanatory remarks" (part 3), by Edwin Lees, Esq., F.L.S. The paper was accompanied by drawings and specimens.

July 5.—Dr. Francis Bossey in the Chair.

Specimens of the following plants were exhibited, sent to the Society by Mr. Hewett Watson:—

Carex elongata (Linn.), found abundantly in Weybridge marshes. This locality is interesting to the metropolitan botanist, the nearest habitat previously on record being in the county of Salop.

A pubescent-flowered variety of *Bromus commutatus* (Schrad.), found plentifully along with the more abundant glabrous form in a meadow by the river Mole, between Esher and West Moulsey, Surrey. This variety affords another instance to prove the little importance which can be given to the character of smooth or downy flowers as a specific distinction in this genus. It will form an addition to the 'London Catalogue of British Plants' (*C. pubens*), to be entered under "*Bromus* (1355) *commutatus*."

A specimen of *Lolium multiflorum*, the root of which was dug up when in flower in a sown field last year, and the plant is now copiously flowering in Mr. Watson's garden; thus proving its perennial existence, although the alleged annual root of *L. multiflorum* has been considered the best distinction between this supposed species and *L. perenne*. The other alleged differences are equally invalid.

Garden specimens of *Festuca pratensis* (Huds.) and *F. arundinacea* (Schreb.), to show the strongly marked differences between them; the latter being three times the size, extremely harsh to the touch, and very dissimilar in its flowers and mode of inflorescence. In *F. pratensis* the branches of the panicle are erect after flowering, the paleæ or glumes obtuse and awnless, and the sheaths of the leaves nearly smooth; in *F. arundinacea* the branches of the panicle are horizontal or reflexed, the glumes acute and awned, and the sheaths and leaves very rough.

Mr. Watson admitted *Festuca loliacea* and *pratensis* to be forms of one species; indeed he had shown this to the Edinburgh botanists just after they had printed their Catalogue, in which *F. loliacea* is kept as a distinct species, while *F. pratensis* is united with *F. elatior* (Linn.). But he was not yet prepared to combine all three and *F. arundinacea* likewise under the one name of *F. elatior*, as is done by Mr. Babington. Mr. Watson's plant of *F. arundinacea* was originally brought to his garden from the Isle of Wight, and is now a large sheaf with hundreds of flowering stems, five to seven feet high, and the root-leaves half a yard long.

A specimen of *Œnanthe pimpinelloides* (Linn.), to show the cylindrical form of the fruit, which exactly corresponds with that of the Sardinian plant (admitted to be the true species), except in having less callosity at the base. This was taken from a plant in Mr. Watson's garden, the parent of which had been brought thither from a hedge-bank in the Isle of Wight. Mr. Watson recognised a second species in Britain, often sent to him under the name of *Œnanthe peucedanifolia*, and readily distinguished by its turbinate or elliptic fruit, upon extremely short pedicels, and more resembling *Œ. globulosa* than *Œ. pimpinelloides*. The peculiar form of the root in some other specimens, resembling that of a dahlia in miniature, induces a supposition that these may be a third species, although Mr. Watson has satisfied himself that the roots vary greatly with age and situation, and do not afford such certain characters for distinction as may be found in the fruit. The *Œ. Lachenalii* (of Babington's 'Manual') is apparently the species frequently sent under the name of *Œ. peucedanifolia*, though occasionally named *Œ. pimpinelloides* by English botanists. Mr. Watson would illustrate this subject more fully on another occasion.

Specimens of the garden fennel, to show the little importance to be attached to the difference of the stems being fistulose or filled with pith. These specimens were sections of stems arising from a single root, of different dimensions, but of nearly equal age and stage of development. Some of them (the thicker) were hollow, others filled with pith. A question respecting a distinction of species between the wild and garden fennels has been raised in consequence of one author describing the stems as fistulose, while another finds them solid; but since both conditions can exist on one root at the same time, such a distinction would be quite inadmissible for a specific character.

A stem of *Hieracium Lawsoni*, which had borne twenty flowers in Mr. Watson's garden this spring, and others had flowered more numerously than this one. In the wild state on the Grampians (the locality from which the plants were brought three years ago) this species has usually two, three, or four flowers only. He had seen a wild Irish specimen with six or eight flowers. No care had been bestowed upon the plants in his garden, except occasional watering in dry weather, and removal of weeds from about them. Mr. Watson sent the specimen merely as an example of the little dependence to be placed upon the number of flowers in the *Hieracia*; indeed among the Compositæ generally. A wild plant, growing free from the interference of other plants about it, might also increase its flowers five or tenfold, as practical botanists must be well aware from observation.

Read "A Synoptical View of the British Fruticose *Rubi*, arranged in groups, with explanatory remarks" (part 4), by Edwin Lees, Esq., F.L.S. The paper was accompanied by drawings and specimens.

August 2.—J. Reynolds, Esq., Treasurer, in the Chair.

Mr. G. S. Gibson and Mr. J. Tatham, jun., presented specimens of a new British plant, *Spergula stricta* of Swartz (*Arenaria uliginosa*, Schleich. and DeCand.; *Alsinantha stricta*, Fenzl and Reichenbach),

discovered by them in June last (in company with Mr. James Backhouse and son and Mr. Sylvanus Thompson) near the top of the Weddy Bank Fell, about ten miles west of Middleton in Teesdale, and five from the High Force in Durham; the elevation was about 1800 feet. The locality was confined to a very small space.

Specimens of *Anemone ranunculoides* were presented by Mrs. M. Stovin, found *wild* in a wood near Worksop, Nottinghamshire. Specimens from this locality were presented in June last; and in a letter to the Secretary, Mrs. Stovin observes, "the more I see and hear of this plant in the Nottingham station, the more am I convinced of its being wild."

The concluding portion of Mr. Lees's elaborate paper on the British Fruticose species of *Rubus* was read, and several specimens and drawings exhibited in illustration of the views contained in the essay.

GEOLOGICAL SOCIETY.

Nov. 29, 1843.—Prof. Sedgwick concluded his memoir, "On the Geology of North Wales," read June 21, 1843.

The author maintains the threefold division of the older rocks. The middle division is now illustrated by more detailed sections, especially through different parts of the Berwyn chain. The first and principal section is from the porphyries of Arrenig across the Lake of Bala, and over the crest of the Berwyns to Llangynog. The whole of this section is placed in a fossiliferous system, and the thickness of the beds actually associated with fossils is several thousand feet. The difference between this result and one stated by Mr. Sharpe, is accounted for, first, by a different computation of the thickness of certain beds about the position of which there is no doubt, and, secondly, by a different interpretation of phænomena, Mr. Sharpe terminating his section abruptly against a supposed fault, while Professor Sedgwick makes a regular ascending section, and places in the highest part of the series certain beds which Mr. Sharpe calls *Cambrian*, and regards as a part of a lower and non-fossiliferous group. In short, Professor Sedgwick extends his section among the fossil groups several miles to the east of the supposed line of fault of Mr. Sharpe. Other sections are described, drawn through the southern part of the Berwyns, which is shown to rest on a great trough formed by the Bala limestone. The author then gives a general and detailed account of the physical structure of the whole Berwyn chain, which measured, on the curved line of the water-shed, is not less than thirty miles long. The whole crest of this chain, with the exception of about five miles, is composed of beds superior to the Bala limestone. The author then describes the sections on the east side of the Berwyns, and the section on the Ceiriog and the Dee, which connect the part of the protozoic group, which is the exact equivalent of the Caradoc sandstone, with the Denbigh flagstone, which represents the upper Silurian rocks of Mr. Murchison. After discussing the sections in detail he draws the following conclusions:—

1. The base of the fossiliferous system is unknown, for beds (occa-

sionally alternating with contemporaneous porphyries) of great thickness occasionally present fossil bands with *Asaphus Buchii*, &c. These are below the level of the limestone seen in the Arrenig section. 2. That the limestones near Bala (three of which are on the line of section, and one at a still lower level) contain fossils which point to a lower level than the Caradoc sandstone, and rather conform, especially in the lower beds, to the character of the Llandeilo flagstone. 3. That the higher part of the section on the Ceiriog conforms to the best types of the Caradoc sandstone, and passes into the system of the Denbigh flags. 4. That the lower Silurian beds in Westmoreland do not conform to the above type: they may be compared with the upper part of the Ceiriog section, and perhaps with the *highest* part of the Arrenig section; but they admit of no comparison with the lower and by far the thicker part of the protozoic group of North Wales. Lastly, the author, as in a former paper, divides the upper Silurian rocks of Denbighshire, &c. into three primary divisions or groups. The complicated Llangollen sections he puts entirely in the lowest of the three divisions. He confirms his former views by some new details and general remarks, accompanied by lists of fossils.

Dec. 13, 1843.—The following papers were read:—

1. "Notes respecting the Coal Measures, Limestone, and Gypsiferous Strata of the Island of Cape Breton." By Mr. R. Brown.

The author gives the details of certain sections in the coal-fields of Cape Breton, confirmatory of Mr. Lyell's views of the relative age of the gypsum and other strata in that island.

2. "On the lower Carboniferous Rocks or Gypsiferous Formation of Nova Scotia." By Mr. J. W. Dawson of Pictou, Nova Scotia.

The coal formation of the eastern part of Nova Scotia consists of a great thickness of sandstones, shales and conglomerates of various reddish and gray colours. The lower part of the series is distinguished by the presence of limestones with marine shells and gypsum. In this paper the author examines the structure and relations of the lower or gypsiferous formation, prefacing it with a notice of the general disposition of the rocks of the carboniferous system in the region extending along the shores of the Gulf of St. Lawrence, from Tatmagouche to Antigonish Harbour. The gypsiferous formation is described as met with at East River, Merigonish, Antigonish, and Shubenacardie. The results of Mr. Dawson's inquiries confirm the views advanced by Mr. Lyell in his papers on the geology of Nova Scotia.

3. "On Concretions in the Red Crag at Felixstow, Suffolk." By the Rev. Prof. Henslow.

The concretions described are more or less spheroidal, fusiform and cylindrical, many of them amorphous masses of a fine-grained, compact, dark brown ferruginous claystone. Their surfaces are smooth, often polished, and they sometimes include organic remains. Prof. Henslow regards them as of coprolitic origin. Resembling them are certain silicified masses, which prove to be the petro-tympanic bones of extinct Cetacea; and Prof. Owen has determined that

Prof. Henslow's specimens belonged to no less than four distinct species of whales of the genus *Balæna*.

Jan. 3, 1844.—The following papers were read:—

1. "On the occurrence of the genus *Physeter* (or sperm whale) in the Red Crag of Felixstow." By Mr. Charlesworth.

In the collection of Mr. Brown of Stanway, is a remarkable fossil, which Prof. Owen proved to be the tooth of a cachalot, and in the Report of the British Association for 1842 states to have been procured from the diluvium of Essex. Mr. Charlesworth, having examined the specimen in question, considers it a genuine crag fossil from the same deposit with the Cetacean remains, described by Prof. Henslow at a previous meeting, as just noticed.

2. "On a Fossil Forest in the Parkfield Colliery, near Wolverhampton." By Mr. H. Beckett.

The author announces the discovery of a remarkable assemblage of stumps of fossil trees in the Parkfield Colliery, all upright and evidently *in situ*. There are two fossil forests, one above the other. In the upper, Mr. Beckett counted seventy-three trees in about a quarter of an acre, and in the lower they appear to be equally numerous.

3. "On the Remains of fossil dicotyledonous trees in an outcrop of the Bolton coal, at Parkfield Colliery." By W. Ick, Ph.D.

This paper relates to the same locality with the last, and includes numerous details of the state of the fossil forest, its geological relations and accompanying fossils. Dr. Ick describes three distinct beds of coal, each exhibiting on its surface the remains of a forest, all included in an assemblage of strata not more than twelve feet in thickness. He considers the trees to have been mostly coniferous, and concludes that they grew on the spot where they are now found.

4. "On a fossil tree found in the coal-grit, near Darlaston, South Staffordshire." By Mr. J. S. Dawes.

This remarkable fossil, although not entire, is thirty-nine feet in length, and its greatest breadth not more than twenty inches. The wood is coniferous.

5. "On the Trap-rock of Bleadon Hill, in Somersetshire." By the Rev. D. Williams.

In consequence of some remarkable facts disclosed by the railway cutting through the western point of Bleadon Hill, the author's views respecting the origin of trap and other aggregate rocks, advanced in former papers, have undergone a material change. In this paper he details the phænomena which lead him, among other conclusions, to maintain that the lime rocks, in the cases under consideration, have been reduced *in situ* by tranquil fusion, and subsequently converted into the trap which now replaces them. The extent and variety of the subjects embraced in this memoir do not admit of a short notice.

Jan. 17.—The following papers were read:—

1. "On Fossil Crustaceans from Atherfield, in the Isle of Wight." By Prof. Bell.

The fossils described in this paper were preserved in the lower

greensand, and belong to the family of *Astacidæ*, probably to the genus *Astacus*. They are distinct from any known recent or fossil species.

2. "On the occurrence of Phosphorite in Estremadura." By Prof. Daubeny and Capt. Widdrington.

The phosphorite rock, the extent of which had been greatly exaggerated by Spanish writers, is situated at a short distance from Logrosan, a village of Estremadura. It lies in an extensive clay slate formation, and is interstratified with the slate, appearing on the surface for about two miles, presenting a breadth of usually about twenty feet, and a thickness as far as could be ascertained of ten. Its presence does not appear to communicate fertility to the soil. It is composed of phosphate of lime, associated with fluoride of calcium, oxide of iron and silica. The authors examined it with a view to its employment as a manure; but great difficulties exist with respect to its transportation.

3. "On the Cretacean Strata of New Jersey, and other parts of the United States." By Mr. Lyell.

The author proves, from a careful examination of their fossils, that the ferruginous and greensand formation of New Jersey corresponds to the uppermost part of the cretaceous system in Europe. Four or five, out of sixty fossil shells, are identical with European species, giving an agreement of 7 per cent., whilst a great number of the remainder are nearly allied to and represent species from the middle and upper part of the European cretaceous beds. Teeth of sharks, some of them allied to known cretaceous forms, and vertebræ of Mososaurus and Plesiosaurus accompany them. The upper fossiliferous division of the New Jersey cretacean deposit, observed by Mr. Lyell at Timber Creek, near Philadelphia, judging from the evidence afforded by certain of its fossils, of which, however, the great part, especially of the corals, are new, must be regarded as equivalent to the uppermost (Maestricht) part of the cretaceous system. Among the Echinodermata and Foraminifera are several characteristic cretacean forms.

Jan. 31.—The following papers were read:—

1. "A Vertical Section of the Strata between the Chalk and the Wealden on the South-east Coast of the Isle of Wight." By Mr. Simms.

The thickness of the upper greensand given in this section is 104 feet, that of the gault 146 feet, and that of the lower greensand 754 feet 3 inches; giving a total thickness of the beds beneath the chalk of 1004 feet 3 inches.

2. "A Report on the British Lower Greensand Fossils in the Society's Collection." By the Curator, Prof. E. Forbes.

There are 131 species of Mollusca, and between 30 and 40 Radiata and Annelida in the Society's cabinets. Of the Mollusca, 60 are additions to the British greensand fauna, mostly discovered within the last twelve months. Half of this number are new species; and among the rest are many characteristic Neocomian forms.

3. "A Report on the Collections of Fossils from Southern India,

presented to the Society by Mr. Kaye and the Rev. Mr. Egerton." By the Curator.

The species from the beds discovered by Mr. Kaye at Pondicherry are, with a few exceptions, new. Among those from Verdachellum and Trinconopoly, are several well-known greensand fossils. The Pondicherry beds appear, from the evidence afforded by their organic contents, to belong to the lowest part of the lower greensand; whilst those at Verdachellum and Trinconopoly may be referred to the upper greensand. In this Report 156 new species of Mollusca are described and named.

4. "On the European Equivalents of the Permian System, with a General View and Table of its Organic Contents." By Mr. Murchison and M. de Verneuil.

The chief objects of this paper are,—1st, to sustain Mr. Murchison's original opinion, that the rothe-todte-liegende forms the true base of the Permian system; 2ndly, to point out the equivalents in Western Europe of the Russian series of this age, and to extend the upper palæozoic rocks, so as to embrace the lower part of the bunter sandstein; 3rdly, to analyse the flora and fauna, showing, that whilst connected downwards with the carboniferous rocks, they were entirely dissimilar from those of the overlying trias; and, lastly, to vindicate the use of the collective word *Permian*, and its application to a recently published map of England, as derived from a group of strata never previously united through their geological relations and organic remains.

Feb. 21.—The following papers were read:—

1. "Some account of the Strata observed in the course of the Blechingly Tunnel, Surrey, in the year 1841." By Mr. Simms.

The tunnel was carried through a spur of a range of hills, formed by the escarpment of the lower greensand. In the line of the cutting, the spur consisted chiefly of Weald clay, and proved to form part of an anticlinal axis, which extends across the Weald from the chalk of the North Downs in Surrey, between Merstham and Garlstone, to the chalk of the South Downs in Sussex, near Ditchling.

2. "Some Remarks on the White Limestone of Corfu and Vido." By Captain Portlock, R.E.

The author has found fossils in the limestone of Vido. They are very locally distributed, Ammonites in one place, and Terebratulæ in another; the former in bad condition, the latter very perfect. They appear to be nearly allied to *Terebratula Pala* and *T. resupinata*, oolitic species, and to a species from Dundry. Captain Portlock regards them as new, and names the species *T. Seatoni*; inferring, from their presence, that the limestone in question is probably oolitic.

MISCELLANEOUS.

The genus Chiton *found in the Magnesian Limestone of Durham.*

A LATE field-day among the magnesian limestone beds of the neighbourhood of Sunderland has yielded me nearly all the plates of a

beautiful species of *Chiton*. This is a discovery of some importance to the fauna of the Permian epoch. The fact of the existence of this genus at so early a period, or rather an earlier one, was first made known by Duchastel and Puzos, who found it in the carboniferous beds of Tournay; lately De Koninck has figured two or three species from the same locality. Only two species (*C. Grignonensis* and *C. fascicularis*) have been published as tertiary, and none I believe have yet been discovered in the intermediate formations. This ought to induce collectors to look out for the remains of this genus in the secondary rocks, for in such I have no hesitation in saying that they will hereafter be found. I strongly suspect that Professor Phillips has been describing from the postal plate of some Chitons when he constructed the genus *Metoptoma*: the corresponding plate of the magnesian limestone species has precisely the form of the so-called *Metoptoma imbricata*, *M. pileus* and *M. sulcata*. It is probable however that *Metoptoma oblonga* (judging from what appears to be a muscular impression in the figure, if it represent a cast) belongs to a different genus—say *Capulus*.

Museum, Newcastle, Oct. 20, 1844. Wm. King.

ON THE HABITS OF THE GODWIT.

To the Editors of the Annals of Natural History.

Gentlemen,

On the reading of a paper in the Section of Natural History of the British Association relating to the habits of some of our native birds, the Very Reverend the President of the Section is reported in the Athenæum (No. 883.) to have made the following observation:—

"The godwit had been mentioned: it had a long bill, and it was generally supposed that birds with long bills lived by suction, but this was not the case with the godwit, as it fed voraciously and flourished upon barley. It could not drink in deep water, but was always obliged to have recourse to the edge of a stream to drink."

With respect to the godwit, it may be perfectly true that it feeds on barley, although the fact has never come under my own observation, notwithstanding a very long residence on the coast, where I have had opportunities of seeing hundreds of the birds in question feeding on the slobs, the muddy margins of estuaries and on sandy shores, as well as far inland. But though I dispute not the statement as to the godwit's grain-eating propensities, I most positively assert that it also frequently "bores" in moist earth in search of food, in a similar manner to the snipe, having frequently seen it do so along the margins of freshwater streams, which at low water run over sandy or muddy flats, and where the sand or mud is not very compact. Another favourite haunt of the godwit is by the sides of the channels left at low tide in salt-water lagoons. The bill is then inserted in the soft mud or sand to its base, apparently for the purpose of securing such objects of food as harbour beneath the surface.

As to snipes and other long-billed birds living on suction nothing can be more opposed to fact, for the snipes feed on the larvæ of in-

sects, which are found in such profusion in moist places as to cause the birds to resort there at feeding time,—the larvæ of the ephemera and dragon-fly being especial favourite objects of their research. I have on several occasions shot snipes with the larvæ of the Libellula still remaining in the gullet, so that I have no doubt whatever of the fact of the birds eating them.

I am, Sir, your very obedient servant,

1 Paul Street, Kingsdown, Bristol, October 21, 1844. THOMAS AUSTIN.

BATARREA PHALLOIDES.

Mr. Frost gathered two specimens of this rare fungus in the beginning of October, in an old pollard ash-tree in Lady Grenville's park at Dropmore. One he sent to Sir W. J. Hooker, the other to the Botanic Society in the Regent's Park, where it is preserved, and an attempt made to propagate it by its sporules.

J. D. C. SOWERBY.

METEOROLOGICAL OBSERVATIONS FOR SEPT. 1844.

Chiswick.—September 1. Slight fog: exceedingly clear, hot and dry. 2. Foggy: clear, hot and dry. 3. Fine: overcast. 4. Densely overcast and fine. 5. Cloudy and fine. 6. Rain: cloudy. 7. Slight rain: cloudy: clear and fine. 8. Very fine. 9. Densely overcast. 10. Overcast and fine. 11. Slight fog: very fine. 12. Overcast and fine. 13, 14. Very fine. 15. Cloudy: rain. 16. Very fine. 17. Showery: heavy rain at night. 18. Rain. 19. Clear and very fine. 20. Drizzly: hazy. 21. Very fine. 22, 23. Cloudy: very fine. 24. Very fine. 25. Slight fog: very fine. 26, 27. Mornings foggy: clear and fine. 28. Dense fog: heavy dew: clear and exceedingly fine. 29. Drizzly: cloudy and fine: clear: slight frost. 30. Slightly overcast: clear and fine.—Mean temperature of the month 1°·8 above the average.

Boston.—Sept. 1, 2. Fine. 3. Cloudy. 4. Windy. 5. Windy: lightning at night. 6. Cloudy: rain, with thunder and lightning from noon to 5 P.M. 7. Cloudy. 8. Fine. 9. Rain. 10, 11. Fine. 12—14. Cloudy. 15. Stormy: rain early A.M. 16. Fine. 17. Cloudy: rain early A.M.: rain A.M. 18. Cloudy. 19. Fine: rain early A.M. 20. Fine: rain early A.M.: rain P.M. 21, 22. Cloudy. 23. Windy: rain A.M. and P.M. 24. Fine: rain P.M. 25—28. Fine. 29. Cloudy: rain early A.M. 30. Cloudy.

Sandwick Manse, Orkney.—Sept. 1. Clear. 2. Clear: hot. 3. Clear: drizzle. 4. Fog: fine: fog. 5. Bright: clear. 6. Cloudy: fine: fog. 7. Damp: cloudy. 8. Cloudy. 9. Cloudy: showers. 10. Bright: clear. 11, 12. Bright: showers. 13. Bright: clear. 14. Frost: clear. 15. Damp: drizzle. 16. Damp: drizzle: showers. 17. Drops: drizzle: showers. 18. Frost: clear: cold. 19. Clear: aurora. 20. Frost: clear: aurora. 21. Frost: clear. 22, 23. Clear. 24. Clear: cloudy. 25. Drizzle: cloudy. 26. Showers: drizzle. 27. Damp: drizzle. 28. Cloudy: clear. 29. Showers: clear. 30. Rain.

Applegarth Manse, Dumfries-shire.—Sept. 1—4. Fair and fine. 5. Fair and fine, but cloudy. 6. Showery: lightning. 7. Shower: thunder. 8. Shower. 9. Fair and fine. 10. Fair and fine, but cloudy. 11. Fair and fine: one slight shower P.M. 12. Rain P.M. 13. Rain all day. 14. Rain very heavy. 15. Fair. 16. Shower. 17. Showery. 18—22. Fair: fine harvest day. 23. Fair, but cloudy. 24. Fair: clear. 25. Fair: cloudy. 26. Fair. 27. Fair: cloudy. 28. Rain all day. 29, 30. Fair and clear.

Mean temperature of the month	54°·07
Mean temperature of Sept. 1843	56 ·30
Mean temperature of Sept. for twenty years	52 ·5
Mean temperature of spring water	50 ·3
Mean temperature of ditto Sept. 1843	62 ·0

Meteorological Observations made by Mr. Thompson *at the Garden of the Horticultural Society at* Chiswick, *near London; by* Mr. Veall, *at* Boston; *by the* Rev. W. Dunbar, *at Applegarth Manse,* Dumfries-shire; *and by the* Rev. C. Clouston, *at Sandwick Manse,* Orkney.

Days of Month.	Barometer.							Thermometer.							Wind.				Rain.			
	Chiswick.		Boston.	Dumfries-shire.		Orkney, Sandwick.		Chiswick.		Boston.	Dumfries-shire.		Orkney, Sandwick.		Chiswick.	Boston.	Dumfries-shire.	Orkney, Sandwick.	Chiswick.	Boston.	Dumfries-shire.	Orkney, Sandwick.
1844. Sept.	Max.	Min.	8¼ a.m.	9 a.m.	9 p.m.	9½ a.m.	8½ p.m.	Max.	Min.	8¼ a.m.	Max.	Min.	9½ a.m.	8½ p.m.	1 p.m.							
1.	30·380	30·335	29·71	30·25	30·25	30·20	30·25	84	44	64	71	45	64	56½	se.	calm	sw.	s.	.....	.....	.....	.....
2.	30·322	30·192	29·76	30·26	30·18	30·27	30·27	79	50	63·5	75½	46	68	60	e.	calm	nw.	se.	.....	.....	.....	.....
3.	30·097	30·020	29·62	30·16	30·15	30·27	30·27	74	61	62	71	55	60	50½	e.	e.	ne.	se.	.....	.....	.....	.....
☾ 4.	29·977	29·926	29·44	30·16	30·12	30·33	30·32	78	60	63	72	53	50½	50½	e.	se.	ne.	s.	·02	.....	.....	.....
5.	29·926	29·801	29·32	30·04	29·91	30·27	30·18	73	54	62	71	54	60½	50½	e.	e.	ne.	ese.	·03	.....	.....	.....
6.	29·934	29·837	29·22	29·86	29·80	30·04	29·81	76	57	63	65	57	50½	50½	sw.	calm	ne.	se.	.....	.....	.....	.....
7.	29·913	29·894	29·33	29·76	29·70	29·68	29·95	77	55	62	69	57	50	46	sw.	calm	se.	nne.	·01	·45	0·78	·05
8.	29·873	29·840	29·34	29·78	29·77	29·92	29·77	79	55	61·5	60	53	49	51	se.	calm	ne.	sw.	·28	.....	.....	.....
9.	29·747	29·717	29·20	29·70	29·65	29·60	29·56	66	54	58·5	61	48	53	50	w.	ne.	sw.	w.	·24	·09	.....	.....
10.	29·954	29·820	29·30	29·69	29·84	29·64	29·78	69	40	57·5	61	49	52	52	sw.	calm	ssw.	w.	.....	.....	.....	·10
11.	30·014	29·995	29·48	29·88	29·83	29·73	29·65	73	44	56	61½	42	57	51	n.	calm	w.	wsw.	.....	.....	.....	.....
● 12.	30·089	30·011	29·44	29·88	29·98	29·70	29·97	70	51	58	61	48	51	46½	w.	calm	s.	wsw.	.....	.....	.....	·12
13.	30·159	30·138	29·55	30·01	29·96	30·07	30·14	73	51	56	61	42	51	40	sw.	calm	e.	.....	.....	.....	.....	·16
14.	30·078	30·030	29·52	29·83	29·78	30·14	30·08	74	56	57	58½	48½	49	48	sw.	calm	e.	e.	·03	.....	2·67	.....
15.	29·857	29·825	29·19	29·56	29·52	29·92	29·71	72	61	60	63½	55	53	53½	se.	s.	e.	e.	·05	·35	.....	.....
16.	29·848	29·838	29·19	29·60	29·63	29·61	29·70	73	61	62	62	54½	54	52½	w.	w.	e.	nw.	.....	.....	.....	·09
17.	29·729	29·708	29·10	29·65	29·76	29·85	30·02	72	53	62	58½	51½	52	45	sw.	calm	e.	ne.	·47	·20	.....	·19
18.	29·989	29·729	29·36	29·96	30·02	30·13	30·19	62	37	56	56½	45	50	47	ne.	ne.	ene.	calm	·11	·27	.....	.....
☽ 19.	30·068	29·933	29·47	30·03	30·01	30·20	30·25	65	42	57	59½	44	51	45	ne.	e.	ne.-n.	.....	.....	·09	.....	.....
20.	30·028	29·997	29·47	30·10	30·12	30·32	30·32	66	40	58·5	56½	43	51	42	e.	calm	ne.	.....	.....	·11	.....	.....
21.	30·091	30·048	29·64	30·17	30·17	30·30	30·27	64	47	56	57	39½	49	44	ne.	calm	ne.	.....	·01	·34	.....	.....
22.	30·036	29·921	29·60	30·12	30·00	30·22	30·13	61	49	55	56	34	49	42	e.	calm	ne.	se.	.....	.....	0·12	.....
23.	29·741	29·692	29·30	29·90	29·90	30·08	30·08	62	49	54	52⅓	36⅓	52	47½	ne.	ne.	ne.	.....	.....	.....	.....	.....
24.	30·081	29·893	29·42	29·99	30·05	30·08	30·07	65	39	55	59	46⅔	51	51	ne.	calm	nw.	sw.	.....	·40	.....	.....
25.	30·234	30·174	29·65	30·10	30·10	30·02	29·98	65	35	49	56½	34	53½	54	ne.	calm	wsw.	wsw.	.....	·01	.....	·08
○ 26.	30·270	30·198	29·75	30·08	30·03	29·89	29·85	72	36	52	59	51½	56	55	sw.	calm	sw.	sw.	.....	.....	.....	.....
27.	30·179	30·096	29·65	30·00	29·93	29·87	29·71	70	39	53·5	61½	52	52	55	s.	calm	sw.	sw.	.....	.....	.....	·28
28.	30·047	29·934	29·55	29·84	29·87	29·79	29·98	75	39	52·5	59	54	49⅓	47	w.	calm	sw.	nw.	·05	.....	.....	·70
29.	30·219	29·961	29·48	30·09	30·17	30·03	30·20	59	30	53	58	37	47	41½	ne.	n.	nw.	w.	·01	·19	0·12	·12
30.	30·328	30·242	29·85	30·17	29·90	30·01	29·63	67	31	46	58	36½	47½	53	se.	calm	s.	w.	.....	.....	.....	·10
Mean.	30·007	29·954	29·46	29·918	29·936	30·006	30·003	70·50	47·33	57·5	61·7	46·4	52·76	49·29					1·31	2·50	3·69	1·99

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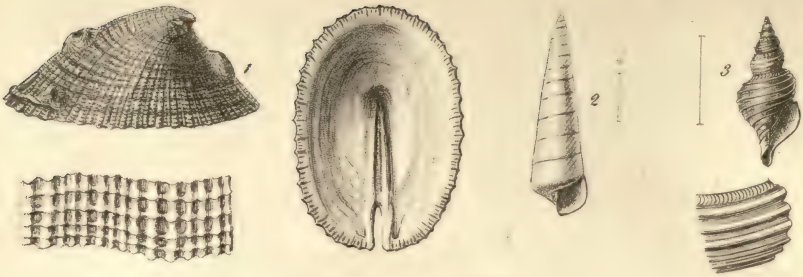
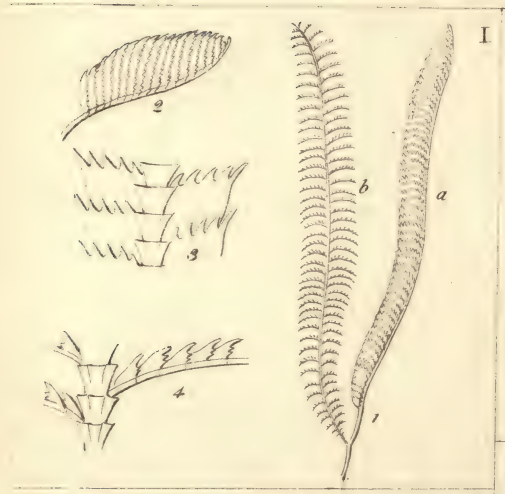
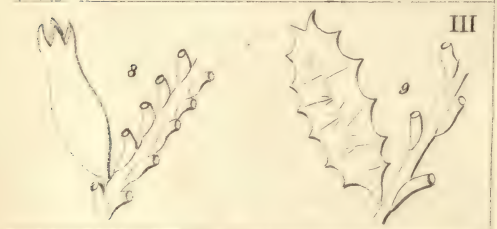
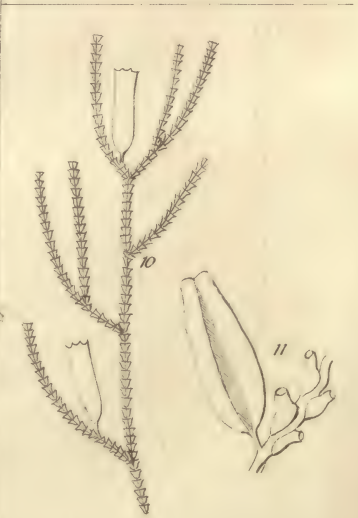
ZOOLOGY

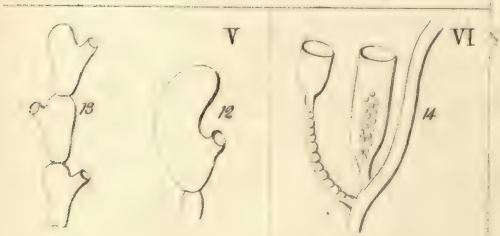


New British Shells.









F. Forbes. del. *Morphology of Zoophytes.* J.D.C. Sowerby. fe.

THE ANNALS

AND

MAGAZINE OF NATURAL HISTORY.

No. 93. DECEMBER 1844.

XLVII.—*On the Morphology of the Reproductive System of the Sertularian Zoophyte, and its analogy with the Reproductive System of the Flowering Plant.* By Prof. E. Forbes, of King's College, London*.

[With a Plate.]

The celebrated Grew, in his 'Idea of a Phytological History propounded,' among other recommendations of the study of vegetable anatomy, urges that "it may frequently conduct our minds to the consideration of the state of animals, as whether there are not divers material agreements betwixt them and plants, and what they are." The present communication has sprung out of such an application of phytological science.

The doctrine of the ideal metamorphosis of the leaf or vegetable individual in order to play a part in the reproduction of the species is now no longer a *quæstio vexata*, but an article of faith with the philosophical botanist. The mind of Linnæus discovered it, the spirit of Goethe divined it, and now that naturalists have been taught to trust in it by the experience of continued research, none but a botanical sceptic will venture to dispute it.

The doctrine of the vegetable individual is presented in its most precise form in the recent essays of Gaudichaud. His type or *phyton*, of an assemblage of which types the plant is composed, consists in itself of a limb or lamina, an ascending axis and a descending axis. Such a type is essentially respiratory and nutritive, and devoted to the life of the individual or congeries of individuals, and must be modified by a metamorphosis, usually retrograde, always ideal, ere it beomes a reproductive organ, and is devoted to the service and perpetuation of the species.

The plant, such as it presents itself usually to our view, is a composite being, made up of many such individuals, some serving to the nourishment of the composite individual or entirety, some metamorphosed either singly or in numbers, so as to assist in the propagation of the species of which that composite being is a member. That composite being is a commonwealth, all the

* Read at the Meeting of the British Association at York in Sept. 1844.

members of which are fixed, though serving different purposes in the state. It is as truly a commonwealth as is the assemblage of bees in their hive or of termites in their hill. In such commonwealths we also see a division of physiological offices. Such commonwealths are to be found for the most part among beings included in the articulate sphere of the animal kingdom; that sphere which is itself representative of the vegetable kingdom, and obedient to the same great general laws.

Now as there are composite animals as well as plants, it becomes a curious and important inquiry to investigate the analogies of their parts and functions, and to see how far our *certain* knowledge of the plant will enable us to throw light on the nature and regulating laws of the composite animal, at present very obscurely understood.

The present communication is intended to show, that in one tribe at least of composite animals, in the Sertularian Polypes, the arrangement and offices of individuals and of the parts of the animal entirely depend on the same laws which determine the arrangement and offices of the parts of the composite plant.

The Sertularian Polype is a branched and horny plant-like polypidom, the axis of which is filled with living pith and the branches studded with little cups or cells in which are seen the fleshy polypes, each a stomach with arms around its mouth for the seizing of its food. Each of these polypes is an individual distinct in itself and acting for itself, yet, besides that individual life, sharing in the common existence of the whole and obeying in reference to its brethren the laws which determine the characters of the species—the constant form and arrangement of the parts of the whole. If the axis should perish all the polypes must perish, but one or several polypes may perish without affecting the others or the life of the axis.

Now all such polypes are true nutritive individuals, devoted to the service of the composite individual or zoophyte of which the polypidom is as it were the bark. The zoophyte begins as a single individual, as the plant begins as a single phyton: polype after polype is built up and shares in the common interest with that first individual, as leaf after leaf is formed to serve in the same commonwealth with the first phyton. The normal type of the zoophyte is a simple stomach, that of the plant is a simple gill.

At certain periods in the life of the zoophyte there appear projecting from the axis or springing from its branches variously formed bodies, usually very dissimilar from the other parts of the whole, in which the ova are after a time formed. These have been called "vesicles," and many opinions have been entertained respecting their nature and origin.

By most naturalists they have been styled evolutions from the

pith or fleshy axis *. They have been termed expansions of the stem †. Some have considered them female individuals ‡ or polypes of a different kind from the rest, inclosed in a larger cell §, and by some the vague term of ovariform buds has been applied to them ||.

Now if the parallel we have drawn so far between the plant and the zoophyte be carried out, these so-called "ovigerous vesicles" should be essentially either single individuals *ideally* metamorphosed into reproductive organs comparable to the monocarpous germens of plants, or a series of individuals joined together and merged into each other in such a manner as to present the appearance of a unique body in which the ova are produced—comparable to syncarpous germens among vegetables. That such is the true view of their nature—however transcendental it may at first sight appear—I have convinced myself, and hope to prove it to the satisfaction of others by an analysis of the several forms of polype-vesicle presented in the family of *Sertulariadæ*.

All the 'ovigerous vesicles' with which I am acquainted may be distributed under six heads or kinds :—

1st. More or less lengthened pod-like bodies, ornamented with ribs and presenting a very complex aspect, such as we see in several species of *Plumularia*, as the British *Plumularia cristata* and the two species figured from Algoa bay. This is in reality the simplest and most easily understood form of vesicle, the form which has undergone least transformation, and which affords the readiest clue to the nature of these bodies. This pod is nothing more than a branch, the axis of which is usually shortened. In a remarkable species which I owe to the liberality of Mr. Bowerbank it retains its full dimensions. The pinnæ are turned in and united at their extremities, and webbed together by the transformed and expanded walls of the polype-cells. The pod has a ventral suture and a dorsal rib; the ventral suture corresponding to the line of junction of the extremities of the pinnæ, and the dorsal rib corresponding to the dorsal rib of the branch and identical in structure. The lateral ribs are the ribs of the pinnæ, and spring from the dorsal rib alternately, exactly as the pinnæ do from the unchanged branches. So slight is the change in this form of vesicle, that it is astonishing the contemplation of it (for it has been frequently carefully figured and described) had not opened the eyes of naturalists long ago to the true nature of these curious bodies.

2nd. Ovate or round berry-like bodies, studded with spinous processes more or less regularly whorled, such as we see in *Thoa muricata*. Bearing in mind the normal spiral arrangement of the

* Johnston, Grant. † Carpenter. ‡ Ehrenberg, Lovèn.
§ Carpenter. || Blainville.

parts of zoophytes on their axis (exactly as the parts of plants), supposing the shortening of the axis of a branch, the abortion of the greater number of its tubular cells and their conversion into spines, we can without much difficulty explain the essential nature of this form of vesicle.

3rd. Such wrinkled, ovate, coronated capsules as we see in *Sertularia rosacea* and *Plumularia pinnata*. These may be regarded as branches reduced to whorls of abortive cells, of which the rugæ are the only traces, whilst the whorl of terminal cells only exhibits a trace of its original nature and forms the corona. That many cells enter into the composition of these highly metamorphic vesicles is borne out by the fact that the vesicle of *Sertularia rosacea* is provided with an internal framework, consisting of a slender axis and radiating processes, which is well seen after the expulsion of the ova. In an exotic species the composite nature of this form is further borne out by the fact of its vesicles dehiscing longitudinally on one side.

4th. Oblong, often triangular or flask-shaped, sometimes compressed vesicles, of which there are numerous examples among our native species of *Sertularia*, as *S. polyzonias*, *S. abietina*, *S. operculata*, *S. argentea*, and the genera *Thuiaria* and *Antennularia*. In these it would appear that all the cells had been metamorphosed in the highest degree, and that the midrib is suppressed for the formation of the ovarian cavity. In such species of *Sertularia* as have alternate cells, the termination of this form of vesicle is usually oblique; in those which have opposite cells it is straight. In *Antennularia*, where the cells are unilateral, the beak of the vesicle is turned to one side. These facts afford strong arguments in favour of the view I have taken of its essential nature, further supported by the arrangement of the vesicles in relation to the branches on a species from the Cape (which also I owe to Mr. Bowerbank), where the vesicles correspond to and represent the branches. See Plate X. fig. 10.

5th. The curious retort-shaped vesicles of *Thoa Beanii* and *Thoa halecina*, which appear to be formed out of a branch reduced to a single joint and a single cell, which merged into each other, form the ovarian capsule.

6th. The apparently simple vesicles of *Campanularia* and *Laomedea*, which may possibly be single cells dilated.

With the exception of the last-mentioned form of vesicle, of the true nature of which I have not yet satisfied myself, the varieties of form of these bodies, then, are all explainable on the theory that they are metamorphosed branches, either branches of the first order (primary axes), or of the second or third (secondary and tertiary axes). They are severally explainable on the supposition of union of parts, or of suppression of some of the elements of a branch, as of some of the cells, or of the central rib or axis, or

of the internodes of that rib or axis. If these bodies were only ordinary cells changed, they would take the place of ordinary cells, and if unilateral on the axis, spring opposite the corresponding cells, but they do not: they arise unilaterally between the pairs of cells in the manner of branches.

From the foregoing considerations, the theory of the nature of the ovigerous vesicle in the Sertularian Zoophytes may be stated thus:—

The vesicle is formed from a branch or pinna through an arrest of individual development by a shortening of the spiral axis, and by a transformation of the stomachs (individuals) into an ovigerous placenta, the dermato-skeletons (or cells) uniting to form a protecting capsule or germen,—which metamorphosis is exactly comparable with that which occurs in the reproductive organs of flowering plants, in which the floral bud (normally a branch clothed with spirally arranged leaves) is constituted through the contraction of the axis and the whorling of the (individual) appendages borne on that axis, and by their transformation into the several parts of the flower (reproductive organisms).

Whether the transformation in the case of the *Sertulariadæ* takes place *ab initio,* or after the individuals have performed for a time their normal function of stomachs, can only be answered by observations on the development of the living zoophyte.

Among the most convincing facts favouring the theory of vegetable morphology are monstrosities which every now and then occur, in which we find the floral axis and its appendages partially transformed into a folial axis and appendages.

Now if the views I have advanced be true, we should expect to find similar cases of monstrosity among Sertularian Zoophytes. I find on searching the records of zoophytology two figures which appear to represent monsters of the kind required.

The first is a figure of *Plumularia cristata* in Dr. Johnston's 'History of British Zoophytes,' pl. 19. f. 2, where a branch is represented as partially transformed into an ovigerous vesicle, whilst the polypes of the lower or basal extremity retain their normal character of nutritive individuals.

The second is a remarkable zoophyte described and figured by Dr. Fleming in the 'Wernerian Transactions,' vol. v. pl. 9, under the name of *Plumularia bullata,* in which branches bearing regular cells seem to spring out of vesicles, and to be changed in some instances into vesicles again.

The consideration of this subject naturally leads us to inquire how far it influences systematic zoophytology, and how far we should consider the form of the vesicle as of generic or specific value. I am inclined to regard its importance as generic. If so, a

new arrangement of the Sertularian polypes is necessary, involving the dismemberment of the genera *Sertularia* and *Plumularia*.

A word on the classification of Zoophytes in general. The great groups of this class as at present constituted are not of equal value, which they should be if the acknowledged arrangements were strictly natural. This will be found on inquiry to arise from the including of the *Bryozoa* among Zoophytes proper, and the merging of the *Hydraidæ*, *Tubulariadæ* and *Sertulariadæ* in one order. The anatomical structure of the *Ascidioida* or *Bryozoa* removes them altogether from the class of *Zoophyta* into that of *Mollusca*, where they should form an order of *Mollusca Tunicata*, parallel with the group of compound *Tunicata* of which *Botryllus* and such forms are examples. The Zoophyta proper may be divided into four very natural orders, the most prominent characters of which will be found in the arrangements of their reproductive system:—viz. 1st, Those which present the ovaries in the form of external bud-like bodies, including the *Hydraidæ* and *Tubulariadæ*. 2nd, Those which have the ovaries formed out of transformed branches or pinnæ, as the *Sertulariadæ*. 3rd, Those which have the ovaries included in the substance of the polypidom, as the *Asteroida*; and 4th, Those which have the ovaries forming a part of the internal constitution of the individual polypes, as the *Zoophyta Helianthoida*.

These four orders I regard as natural, and therefore equal in value.

This paper must be understood only as a sketch; circumstances having prevented my working out the inquiries upon which it is founded. But though the data are not numerous, I conceive they are sufficient to warrant my broaching the idea of the morphology of the polype-vesicle as presented to the Section at this Meeting. That idea is the clue by which we may be led to more perfect researches on this interesting and important subject, and such naturalists as are inclined to admit its truth must also see that it suggests new questions in the philosophy of zoology.

EXPLANATION OF PLATE X.

I. Vesicles of the first order. *Fig.* 1. Branch and vesicle of a *Plumularia* from Algoa bay (*a*, the vesicle; *b*, the branch). In this case the vesicle retains the dimensions of the branch, and is formed by the inflexion and union of the pinnæ and polype-cells. *Fig.* 2. Vesicle of another species of *Plumularia*, in which the axis is much shortened, while the pinnæ are all present. *Fig.* 3. Back of the same, showing the midrib and the manner in which the ribs of the vesicle spring from it, for comparison with *fig.* 4, representing part of a branch of the same species with its pinnæ and midrib. It is evident that the midrib of the vesicle is identical with the midrib of a branch, and that the denticulations of its lateral ribs correspond to the superior elongated teeth of the polype-cells of the pinnæ.

II. Vesicle of the second order. *Fig.* 5. Portion of a branch of *Thoa muricata*, showing the arrangement and form of the polype-cells. *Fig.* 6.

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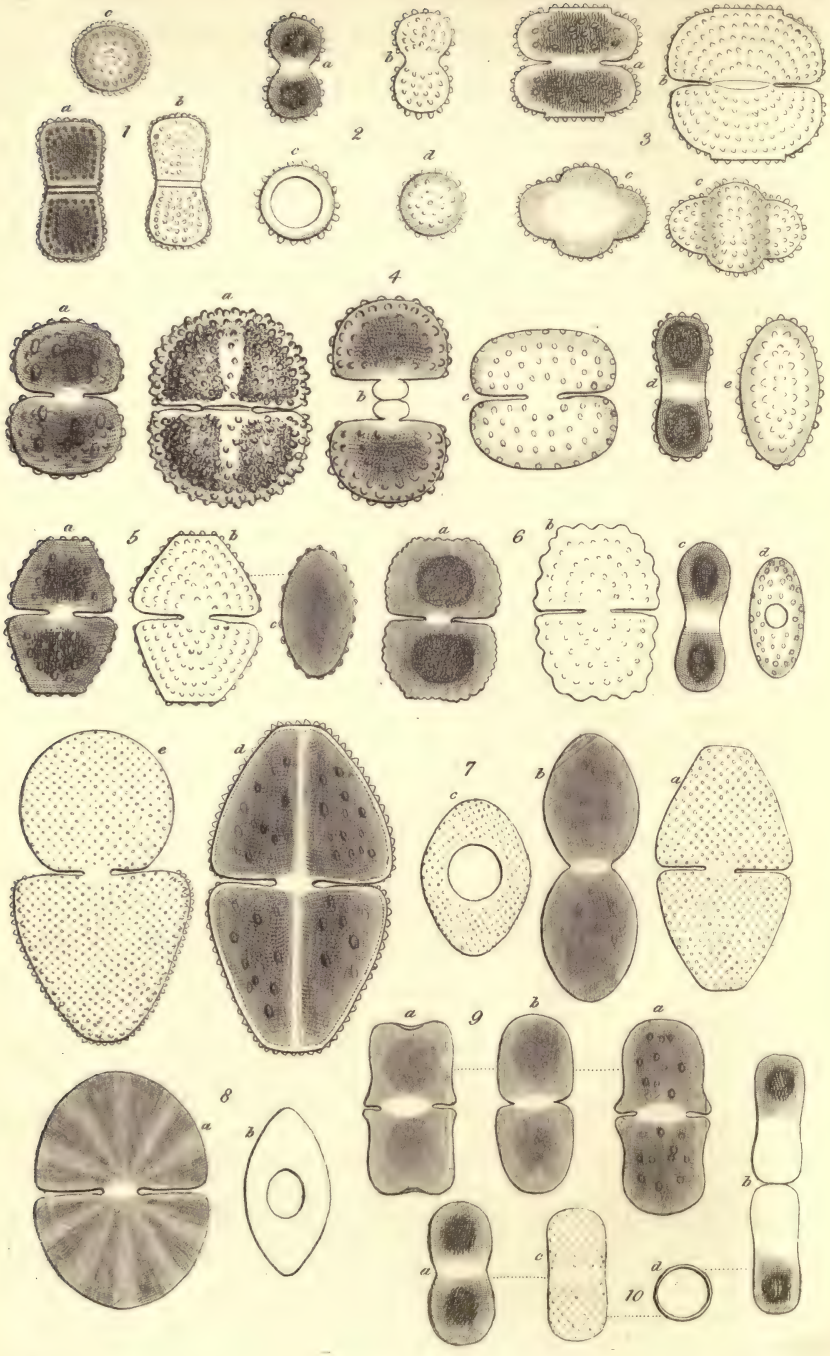

Jno. Ralfs del.

Cosmarium.

J.D.C. Sowerby sculp.

Vesicle of *Thoa muricata*. *Fig.* 7. Idea of the structure of this form of vesicle, which is derived from the shortening of the axis and the whorling and transformation of the cells.

III. Vesicles of the third order. *Fig.* 8. Vesicle and branch of *Sertularia rosacea*. *Fig.* 9. Vesicle of a *Sertularia*, in which an internal framework and axis are seen after the exclusion of the ova.

IV. Vesicles of the fourth order. *Fig.* 10. A *Sertularia*, in which the secondary branches are grouped in pairs; in this specimen two of the branches are converted into vesicles, but retain their original position and relation to their twin branches. *Fig.* 11. Vesicle of a *Sertularia* belonging to this order, exhibiting longitudinal dehiscence.

V. Vesicles of the fifth order. *Fig.* 12. Vesicle, and *fig.* 13, part of the branch of *Thoa Beanii*.

VI. Vesicle of the sixth order. *Fig.* 14. Vesicle and polype-cell of a *Laomedea*.

XLVIII.—*On the British* Desmidieæ. By John Ralfs, Esq., M.R.C.S., Penzance*.

[With a Plate.]

Cosmarium, *Corda*.

Fronds simple, constricted in the middle; segments as broad as or broader than long, neither sinuated nor notched.

The fronds are very minute, simple, constricted in the middle; the segments are generally broader than long and inflato-compressed, are neither emarginate at the end nor lobed at the sides, and have no spines or processes. One species only is longitudinally inflated down the middle, and therefore appears lobed in the end view. In the rest this view is most frequently elliptic; in some species however it is circular.

Ehrenberg united plants belonging to this genus with others having lobed segments in order to form his genus *Euastrum*. Meneghini for the most part followed this arrangement, merely changing the name to *Cosmarium*, as having the prior claim, and also adding some species taken from *Xanthidium*. Under *Micrasterias*, *Euastrum*, and *Xanthidium* I have given my reasons for differing from such high authorities, and also pointed out the characters which distinguish those genera from *Cosmarium*.

Both Ehrenberg and Meneghini consider the inflato-compressed segments essential, but some species (presently to be described) with globular or cylindrical segments can by no means be separated from the compressed ones. Those having cylindrical fronds in some respects show an affinity with *Closterium*, and perhaps *Closterium Cylindrus* would be more suitably united with them. In *Cosmarium* the fronds are never elongated nor curved, and are always constricted in the middle, and the reproductive granules are scattered.

* Read before the Botanical Society of Edinburgh, June 13th, 1844.

Tetmemorus differs from this genus in its elongated fronds and emarginate extremities.

Meneghini divides the plants belonging to this genus into two sections, according as the surface is granulated or smooth. I have used this division, but must remark that the mature plant should be selected when we have to decide upon the absence of granules, because they are frequently undeveloped in the young frond†.

* *Fronds rough with pearly granules.*

1. *Cosmarium cylindricum.* Fronds cylindrical, granulated; segments in the front view subquadrate, broadest at the end and narrower at their junction; end view circular.

Mixed with other algæ on the wet sides of a cave at Lamorna Cove near Penzance.

Fronds minute, cylindrical, about twice as long as broad, rough with pearly granules which give a dentate appearance to the outline; segments subquadrate, broadest at the end, and slightly tapering towards their junction; end view circular.

This species may be known by the circular end view, by the subquadrate appearance of the segments in the front view, and by their junction along their entire breadth, so that no notch is formed at the sides.

Plate XI. fig. 1. *C. cylindricum*: *a*, front view; *b*, empty frond; *c*, end view.

2. *C. orbiculatum.* Segments spherical, rough with pearly granules.

Boggy pools near Dolgelley.

Fronds very minute, composed of two spherical segments which are rough with pearly granules, giving a dentate appearance to the outline; these are obscure or wanting on the neck-like contraction which unites the segments.

Plate XI. fig. 2. *C. orbiculatum*: *a*, front view; *b*, empty frond; *c*, transverse view; *d*, end view.

3. *C. ornatum.* Fronds rough with pearly granules, deeply constricted, the constriction forming a linear notch on each side; end view somewhat cruciform.

In boggy pools about Dolgelley and Barmouth, *J. R.*; Ashdown Forest, Sussex, *Mr. Jenner*.

Fronds about as large as those of *C. margaritiferum*, deeply constricted in the middle; the constriction forms a notch on each side, which is nearly closed by the segments being in close apposition for their entire breadth; segments compressed, broader than long, with an inflation down the middle, and which often slightly projects at the end, where it is truncate. In the end view this inflation forms a rounded projection on each side, and thus appears

† Meneghini has hinted at the probability of this in the following words: "Superficies in nonnullis punctata vel granulato- (uti aiunt) margaritacea, in cæteris lævis, utrum vero hujusmodi diversitas ab ætate pendeat necne, dijudicare nequeo."

somewhat cruciform. The surface is rough with pearly granules, which give a dentate appearance to the margin.

In the front view this species closely resembles *C. margaritiferum*, and frequently can scarcely be distinguished from it, but the end is straight, not rounded in the middle, and in general slightly projects. In the end view they are very different.

Plate XI. fig. 3. *C. ornatum*: *a*, front view; *b*, empty frond; *c*, *c*, end views.

4. *C. margaritiferum*, Mgh. Fronds rough with pearly granules, deeply constricted, the constriction forming a linear notch on each side; segments compressed; end view elliptic. Menegh. Synop. Desmid. in Linnæa 1840, p. 219. *Cosmarium dentiferum*, Corda, Obser. microscop. sur les Animalc. de Carlsbad, p. 30. pl. 6. fig. 41. *Euastrum margaritiferum*, Ehr. Infus. p. 163. tab. 12. fig. 7; Pritch. Infus. p. 196. fig. 126; Bailey, Amer. Bacil. in Am. Journ. of Sciences and Arts, vol. xli. no. 2. p. 295. fig. 8. *Ursinella margaritifera*, Turp. Dict. des Sc. Nat. par Leur. Atl. Veg. (1820.) *Heterocarpella Ursinella*, Kutz. Syn. Diatom. p. 598. *Cymbella reniformis*, Ag. Consp. Diatom. p. 10; Grev. in Hook. Br. Fl. vol. ii. p. 415; Harv. Br. Alg. p. 215.

In bogs, pools, &c., probably common. Weston Bogs near Southampton, and numerous habitats in Sussex and Kent, *Mr. Jenner*; Farnham, Surrey, *Mr. Reeves*; Cheshunt, Herts, *Mr. Hassall*; near Bristol, *Mr. Thwaites*; Barmouth, *Rev. T. Salwey*; Dolgelley, Caernarvon and Penzance.

Fronds rough with pearly granules, deeply constricted in the middle; the segments in close apposition for their entire breadth, whence the constriction appears like a linear notch on each side. The segments are broader than long, subreniform, compressed. The end view is elliptic.

This species is very variable in the size, form, and number of the granules on the surface. Mr. Jenner has sent me drawings of some plants which I am compelled at present to refer to this species, but it is very probable that a better knowledge of them will discover characters by which they may be distinguished from it. In general the granules are of considerable size and give a dentate appearance to the margin, but in some specimens the margin appears quite entire; sometimes they are obtuse, at others acute.

Plate XI. fig. 4. *C. margaritiferum*: *a*, *a*, front views; *b*, new segments; *c*, empty frond of a variety with entire margins; *d*, side view; *e*, end view.

5. *C. Botrytis*, Mgh. Fronds granulated, compressed, deeply constricted, the constriction forming a linear notch on each side; the segments in the front view are truncato-triangular; end view elliptic. Menegh. *l. c.* p. 220. *Euastrum Botrytis*, Ehr. Infus. p. 163. tab. 10. fig. 8.

In pools. Near Bristol, *Mr. Thwaites*; Sussex, *Mr. Jenner*; near Manchester, *Mr. Sidebotham*; Dolgelley.

Fronds more or less granulated, compressed, deeply constricted in the middle, the constriction forming a linear notch on each side. In the front view the segments are broadest where they are in apposition, and gradually narrower towards the end where they are truncate; consequently their figure is somewhat angular.

The end view is elliptic, as in *C. margaritiferum* and *C. crenatum*.

Sometimes the pearly granules are very evident, sometimes obscure.

This species seems intermediate between *C. margaritiferum* and *C. crenatum*, but may be distinguished from both by its truncate ends.

It may be known from *C. ornatum* by the elliptic end view.

PLATE XI. fig. 5. *C. Botrytis*: *a*, front view; *b*, empty frond; *c*, end view.

* *Fronds not granulated, or the granules confined to the margin.*

6. *C. crenatum*. Fronds punctated, deeply constricted in the middle, constriction forming a linear notch on each side; segments compressed, crenate at the margin.

In bogs, small pools, &c. Weston Bogs near Southampton, and several stations in Sussex, *Mr. Jenner*; near Bristol, *Mr. Thwaites*; near Manchester, *Mr. Sidebotham*; Dolgelley and Penzance.

Fronds rather smaller than those of *C. margaritiferum*, deeply constricted in the middle; the close apposition of the segments for their entire breadth renders the notch on each side linear; they are broader than long, compressed, crenate at the margin. The end view is elliptic.

This plant very much resembles a young specimen of *C. margaritiferum*; but as the margin is always strongly crenate, even in the earliest stage, and the surface is punctated and not granulated, I am induced to describe it as distinct.

PLATE XI. fig. 6. *C. crenatum*: *a*, front view; *b*, empty frond; *c*, side view; *d*, transverse view.

7. *C. ovale*. Fronds oval, compressed, punctated, deeply constricted in the middle, the constriction forming a linear notch on each side; end view broadly elliptic.

α. Segments entire at the margin.

β. Segments with marginal granules which give a dentate appearance. *Euastrum*, no. 6, Bailey, *l. c.* p. 295. fig. 28.

In boggy pools. *α*. Dolgelley, *J. R.*; Barmouth, *Rev. T. Salwey*; near Tunbridge Wells, *Mr. Jenner*.

β. Weston Bogs near Southampton, *Mr. Jenner*.

Fronds large, oval, slightly compressed, deeply constricted in the middle, the constriction forming a linear notch on each side; end view broadly elliptic. The empty frond is punctated.

In the Welsh specimens I have always found the margin quite entire, but in some sent me by Mr. Jenner the margin in the front view is furnished with pearly granules which give it a dentate appearance, in which respect it agrees with a plant figured in the 'American Bacillaria.' It appeared to me that the granules formed only a marginal band, and that the rest of the surface was merely punctated as in the Welsh plant; hence no granules were visible in a lateral view, and in an end one only at the extremities. Mr. Jenner, however, finds the outline more or less dentated in every view. In this variety the endochrome in each segment is frequently divided into two portions by a longitudinal pale line.

When the margin is entire this species may be mistaken for *C. Cucumis*, but the frond is oval, not orbicular, and when empty is distinctly punctated. It is also much less compressed, the transverse view being very different.

Plate XI. fig. 7. *C. ovale*: *a*, front view of empty frond; *b*, side view; *c*, transverse view; *d*, front view of var. *β*; *e*, empty frond with newly-formed segment.

8. *C. Cucumis*, Corda. Fronds orbicular, nearly plane, smooth, deeply constricted in the middle, the constriction forming a linear notch on each side; end view elliptico-lanceolate. Menegh. *l. c.* p. 220. *Euastrum integerrimum*, Ehr. Infus. p. 163.

Boggy pools. Sussex, *Mr. Jenner*; Dolgelley.

Fronds orbicular, much compressed, quite smooth, deeply constricted; end view elliptico-lanceolate.

The segments are quite entire at the margin, and I cannot discover any puncta on the empty frond.

Plate XI. fig. 8. *C. Cucumis*: *a*, front view; *b*, empty frond.

9. *C. quadratum*. Fronds deeply constricted in the middle; segments slightly compressed, quadrate in the front view.

Rusthall Common near Tunbridge Wells, *Mr. Jenner*; Dolgelley.

Fronds constricted in the middle, and forming a short linear notch on each side; the segments are compressed, nearly square in the front view, and at the base of each segment is a single protuberance on each side.

Plate XI. fig. 9. *C. quadratum*: *a*, *a*, front views; *b*, side view.

10. *C. Cucurbita*, Breb. Fronds cylindrical with a slight constriction in the middle, about twice as long as broad; end view circular. *Cosmarium Cucurbita*, Desm. no. 1103.

Dolgelley, *J. R.*; Ashdown Forest, and Greatham Bogs near Pulborough, *Mr. Jenner*.

Fronds very minute, cylindrical, rather more than twice as long as broad, with a very slight constriction in the middle and rounded at the ends; transverse view circular with a large central opening. The empty frond appears minutely punctated.

This species has a great resemblance to the figure of *Closterium Cylindrus*, but in that plant the puncta are described as arranged in longitudinal lines, whereas in *Cosmarium Cucurbita* they are scattered.

I am indebted to the Rev. M. J. Berkeley for determining the name of this plant, and also for an opportunity of comparing it with an authentic specimen.

PLATE XI. fig. 10. *C. Cucurbita*: *a*, front view; *b*, new segments; *c*, empty frond; *d*, transverse view.

Analysis.

1.	End view circular; constriction in the front view not forming a linear notch at the side	2
	End view not circular; constriction in the front view forming a linear notch on each side.	
2.	Frond minutely punctated, the outline entire	*Cucurbita.*
	Frond furnished with pearly granules which give a dentate appearance to the outline	3
3.	Segments subcylindrical	*cylindricum.*
	Segments spherical	*orbiculatum.*
4.	End view lobed	*ornatum.*
	End view elliptic or elliptico-lanceolate	5
5.	Segments in the front view subquadrate	*quadratum.*
	Segments not quadrate	6
6.	Fronds oval, slightly compressed	*ovale.*
	Fronds not oval, much compressed	7
7.	Segments entire, without puncta or granules	*Cucumis.*
	Segments dentate or crenate, the surface punctated or granulated	8
8.	Segments truncato-triangular	*Botrytis.*
	Segments not truncate	9
9.	Fronds crenate; surface minutely punctate	*crenatum.*
	Fronds generally dentate; surface granulated	*margaritiferum.*

XLIX.—*Catalogue of Irish Entozoa, with observations.* By O'BRYEN BELLINGHAM, M.D., Fellow of and Professor of Botany to the Royal College of Surgeons in Ireland, Member of the Royal Zoological, Geological and Natural History Societies of Dublin, &c.

[Concluded from p. 323.]

Order 5. CYSTICA.

(Derived from *κύστις, vesica.*)

THE order *Cystica* includes the Entozoa whose organization is the most simple. The animals are included in a membranous sac containing also an aqueous fluid, and generally inclosed in an outer and thicker sac. The body is flattened or cylindrical, terminating posteriorly in a vesicle for each individual, or common to several, within which in some genera the body can be retracted.

The head is furnished with four discs or suckers, and a proboscis armed with a double or single circle of recurved hooks; or with two or four depressions, and four retractile armed processes. In the genus *Acephalocystis* (the lowest in the scale) both head and body are absent, the vesicle or sac alone remaining.

In none of the Cystic Entozoa have generative organs been discovered, the reproductive power appearing not to be limited to any part of the cyst. Neither has any trace of a nervous system been detected in these animals.

Genus 19. Cysticercus.

(Derived from κύστις, *vesica*, and κέρκος, *cauda*.)

Gen. Char.—Body subcylindrical or flattened, terminating posteriorly in a caudal vesicle. Head provided with four discs and a very short proboscis, which is armed with a double circle of minute sharp recurved hooks. Contained solitary in a single cyst.

This genus was established by Bloch under the name *Hydatigera*, changed to *Vesicaria* by Schrank, and to *Cysticercus* by Zeder, which term has been adopted by Rudolphi and all zoologists. The body of many of the species is marked with transverse lines, resembling articulations. The digestive apparatus consists of the four circular orifices or discs already mentioned, by which they are supposed to absorb the fluid secreted into the adventitious cyst in which they are contained; from these orifices the absorbed fluids are carried by four slender canals towards the caudal vesicle.

The species of this genus are almost altogether confined to the mammalia; Rudolphi enumerates fourteen species, seven or one half of which are doubtful.

1. *Cysticercus fasciolaris* *. { Cysts in liver of rat (*Mus decumanus*). / Cysts in liver of mouse (*Mus Musculus*).
2. ——— *tenuicollis* .. { Cysts in peritoneum covering liver of pig (*Sus Scrofa*). / Cysts in peritoneum covering liver of sheep (*Ovis Aries*).

* I have only found the *Cysticercus fasciolaris* in cysts in the liver of the mouse and rat (*Mus decumanus*); much more frequently in the former than the latter. In certain localities they appear to be very rare, and in others very common; usually but one exists; the largest number I ever found in the liver of the same mouse was seven; they were contained in separate cysts, and were of small size. These might readily be taken for a different species from the full-grown specimens, the caudal vesicle being much longer than the body, and the rostellum appearing to be destitute of spines. The shape of the head is also different in some specimens of this species which I possess.

3. *Cysticercus cellulosæ* * / *Tænia cellulosæ* (Pennant, Turton) .... — Cysts in cellular tissue of pig (*Sus Scrofa*).

4. *Cysticercus pisiformis* .. — Cysts in peritoneum of rabbit (*Lepus Cuniculus*).

Species dubiæ.

5. *Cysticercus*†. Cysts in abdomen of loach (*Cobitis barbatula*).

Genus 20. Anthocephalus.

(Derived from ἄνθος, *flos*, and κεφαλή, *caput*.)

Gen. Char.—Body soft and flattened, often nearly cylindrical, varying in length in different species; terminating posteriorly in a vesicle, within which the head and body can be retracted. Head provided with two or four ear-shaped depressions and four re-

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* The *Cysticercus cellulosæ* occurs both in the human subject and in the pig (*Sus Scrofa*), at least the species are considered to be identical. It is very rare in the human subject, and is also of very minute size, so that it may perhaps frequently have been overlooked. It is much more common in the pig, and when abundant gives to the flesh of the animal the appearance which has been termed *measles* or *measly*. Its development is favoured by bad feeding, cold, and too much confinement, the animal does not thrive, becomes weak and emaciated; eventually diarrhœa sets in, the hairs may fall off, or the posterior extremities become paralysed, the body exhales a disagreeable odour, and the flesh is unfit for food. When the disease is at all advanced it is perfectly incurable.

† Upon one occasion I found in the abdominal cavity of the common loach (*Cobitis barbatula*) several very minute globular cysts, not exceeding in size the head of a small pin, and of a white colour; they were attached to the intestines and liver by short and fine cords, and consisted of an outer transparent coat and an internal more opake one; on incising carefully the external coat the internal cyst was protruded, and after this had remained for a short time in water the head was protruded and afterwards the proboscis, the internal cyst forming the caudal vesicle.

When the animal was fully protruded, its length was greater than that of the external cyst. There was no appearance of body between the head and caudal vesicle until the latter was detached; it is extremely short and transversely rugose. The caudal vesicle is diaphanous, and about its centre an opake white body was seen, from which a narrow line extended to the head. The head and proboscis together measure about half the length of the caudal vesicle. The proboscis is subcylindrical, and unarmed apparently, about the same length as the head, and is capable of being retracted within a kind of sheath formed by the head. The latter is spherical; the four oscula were seen in some; but in others, owing to the minuteness of the animal, I was unable to see those parts.

tractile tentacula, armed with recurved hooks. Contained in a double cyst, to which they are not adherent.

This genus, under the name *Floriceps*, was established by Cuvier. Rudolphi changed the name to *Anthocephalus*, which has been adopted by zoologists since. The species are only found in fish, and are not numerous, Rudolphi enumerating but five species.

1. *Anthocephalus elongatus* * . { Cysts in peritoneum and liver of sun-fish (*Orthagoriscus Mola*).
2. ——— *granulum* ? † { Cysts in peritoneum of whiting (*Merlangus vulgaris*). Cysts in abdomen of pouting (*Gadus luscus*).

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* In the month of July 1839 I found several specimens of the *Anthocephalus elongatus* in cysts upon the surface of the liver and intestine of the sun-fish (*Orthagoriscus Mola*). This remarkable species has been well figured by Bremser, and is described in Rudolphi's work. I gave a short description of it and some other species from the same animal in the last volume of Charlesworth's 'Magazine of Natural History'; subsequently I was amused to see a description of (what appears to be) this species in one of the numbers of the 'Edinburgh Philosophical Journal,' in which it is considered a new species and named accordingly.

† In the month of April 1838 I found several pyriform and oblong cysts of a yellowish colour in the abdominal cavity of the whiting (*Merlangus vulgaris*); some were attached by a slender cord to the pyloric appendages or stomach, others were imbedded between the coats of this viscus or of the intestine. On making an incision a second cyst was protruded, which changed its shape on being placed in water, and evidently had some motion. The largest measured from two to three lines; they were white, pellucid, and dotted with minute opake spots; on making an incision into these a little fluid escaped, and the head of an *Anthocephalus* was protruded, which was moved about freely; the four tentacula were visible through the parietes of the anterior portion of the body, rolled up in a spiral manner, and were gradually protruded one after the other.

The largest specimen measured half an inch, including the caudal vesicle; the smallest about one line; and the cysts in which they were immediately contained appeared to form the caudal vesicle. When the animal was alive the head appeared to have four depressions (bothrii), two upon each side, the shape of which was continually changed; when dead, there appeared to be only two, which had somewhat an ear-shape, the margin being tumid. The tentacula, when fully protruded, measured double the length of the head; each was curved inwards at its extremity, and each was armed with three rows of recurved hooks, the longest situated along the inner margin.

The body in the largest specimen measured three lines, was rather

3. *Anthocephalus paradoxus* (Dr. Drummond) .... { Cysts in peritoneum of turbot (*Pleuronectes maximus*).

Species dubiæ.

4. *Anthocephalus*.. { Cysts in abdomen of hake (*Merluccius vulgaris*). Cysts in abdomen of gray gurnard (*Trigla gurnardus*). Cysts in abdomen of red gurnard (*Trigla Pini*).

5. *Anthocephalus** . { Cysts in abdomen of holibut (*Hippoglossus vulgaris*).

6. *Anthocephalus*.. { Cysts in abdomen of haddock (*Gadus Æglefinus*). Cysts in abdomen of whiting-pollach (*Merlangus Pollachius*). Cysts in abdomen of coal-fish (*Merlangus Carbonarius*).

7. *Anthocephalus*.. { Cysts in abdomen of conger-eel (*Anguilla Conger*).

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flattened than cylindrical, nearly of the same diameter throughout, and dotted towards the caudal vesicle with very minute opake spots. In the posterior half of the body two opake bodies could be seen through the parietes, which were cylindrical, rounded posteriorly, and lay parallel to each other; each appeared to terminate anteriorly in a whitish narrow cord which ran somewhat spirally towards the head. The caudal vesicle varied in shape, in some specimens being as long as the head and proboscis together, in others shorter and broader; its diameter was greatest where it joined the body, and it was also dotted all over with very minute opake spots.

* In the month of November 1838 I found a number of cysts in the mesentery, peritoneum, and under the peritoneal coat of the liver of the holibut (*Hippoglossus vulgaris*), upwards of three-quarters of an inch in length; these contained other cysts, on making an incision into which, an *Anthocephalus* was protruded from each, which moved sluggishly in water for a short time. The longest measured nearly half an inch, the shortest three lines.

With some difficulty I was able to examine the head, which is not unlike that of the *Anthocephalus macrourus* in outline, but differed in having only two bothrii, which were deep and of an oval shape; from each two slender tentacula were protruded, which were armed as in the other species, and through the parietes they were seen to be continued backwards and spirally twisted. The head is tetragonal, the neck cylindrical, and within it the head can be retracted. The body cylindrical, apparently articulated in some, while in others no trace of articulation existed; its parietes translucent. The rest of the animal granular and opake.

Genus 21. Cœnurus.

(Derived from κοινὸς, *communis*, and οὐρὰ, *cauda*.)

Gen. Char.—A simple vesicle filled with fluid common to a number of individuals, to which they are adherent. Body soft, extremely short, somewhat cylindrical, rugose rather than articulated. Head distinct, provided with four discs and a short armed rostellum, similar in almost every respect to that of the *Cysticercus*.

The digestive apparatus consists of four suctorial mouths, from which canals have been traced backwards towards the common vesicle, but not continued into it. The genus was established by Rudolphi for a species which is occasionally developed in the brain of sheep and other Ruminantia.

Cœnurus cerebralis * .....
Polycephalus cerebralis (T. Laennec) ...
Tænia cerebralis (Pennant, Turton) .... } Brain of sheep (*Ovis Aries*).

* The *Cœnurus cerebralis* consists of a vesicle of a larger or smaller size common to many individuals; the latter being disposed in groups over its surface, and appearing to the naked eye merely as clusters of opake white spots. The heads resemble those of the *Cysticerci*, each being provided with an uncinated proboscis and four discs, from which canals have been traced towards the common vesicle, but not continued into it.

The development of the *Cœnurus cerebralis* in the brain of sheep gives rise to the disease known to shepherds under the name of *staggers*, or bladder in the brain; they are very seldom found in animals above two years old, and they may be seated in the ventricles of the brain, in its substance, or upon its surface; in the two former cases the disease is nearly incurable, in the latter the animal may be relieved by an operation. The symptoms of course are owing to pressure upon the brain, which will increase as the *Cœnurus* increases in size, and will vary according to the situation in which the entozoon is developed, and to the amount of compression which it occasions.

In the early stage of the disease the animal appears to be stupid, does not keep with the flock, staggers in moving, and hangs its head; the pupil is dilated, and becomes circular instead of oval. In the advanced stage of the disease I have seen the animal with its head inclined to one side, and hanging so low that its nose almost touched the ground; at the same time it continued to turn round upon the same spot for many hours; it appeared to be blind, and would not feed.

When the *Cœnurus cerebralis* is developed upon the surface of the brain, or near to it, the pressure causes absorption of the bone at the part, the skull becomes thinned and soft at this place, and the operation of perforating the bone and evacuating the contents of the vesicle has been sometimes successfully performed. In general

Genus 22. Acephalocystis.

(Derived from *a, non*, κεφαλη, *caput*, and κυστις, *vesica.*)

Gen. Char.—A simple sac filled with a transparent fluid, the coats of which vary in thickness and transparency. Without either head or body. The young developed between the laminæ of the parent cyst, and thrown off either internally or externally.

The genus *Acephalocystis* is not included by either Rudolphi or Bremser among the Entozoa; Prof. Owen however has shown that it is entitled to a place here. The animals which it embraces, usually termed *Hydatids* by pathologists, are amongst the lowest in the scale, consisting when young merely of a simple globular sac filled with a transparent fluid, which coagulates by heat; without either body or head. When this sac attains a certain size the young are developed between its laminæ, and the gemmules are detached sometimes from the internal surface, as in the *Acephalocystis endogena*; sometimes from the exterior, as in the *Acephalocystis exogena.* These increase in size and go through the same changes as the parent cyst.

But little attention has been paid to the specific distinctions between, or to the classification of, these animals. M. T. Laennec described seven species, but his names have not been generally adopted.

1. *Acephalocystis endogena* * ——— *ovoidea* (T. Laennec) ..... Cavity of abdomen, liver, kidney, and other parts of man (*Homo*).

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the operation called *wiring* is preferred; this consists in passing a stiff wire or tube into the nostril upon the side on which the skull has become thinned, and pushing it through the brain up to this point, and thus emptying the cyst. This operation is sometimes, as may be supposed, immediately fatal; at others the injury to the brain excites acute inflammation, the animal moans piteously, and appears to suffer great pain before it dies.

* The *Acephalocystis endogena*, the pill-box hydatid of Hunter, is not very unfrequently met with in the liver and kidney of the human subject, as well as in the ovary, testis, and cavity of the abdomen, constituting a particular form of disease. They usually occur in considerable numbers, and may be developed in the substance of an organ or upon its exterior; in the former case they are always inclosed in an adventitious cyst, formed of condensed cellular tissue. They vary in size from a pin's head to that of an orange, and have been seen as large as the fœtal head. The gemmules are spherical and very small; after being detached they remain for some time in the parent cyst; ultimately however they increase in size, they distend and rupture the parent cyst, and each becomes a parent cyst in its turn.

Species dubiæ.

2. *Acephalocystis* *. Choroid plexus of brain in man (*Homo*).

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* The little transparent globular vesicles which are occasionally found attached to the choroid plexus in the brain of the human subject are denied to be hydatids by pathologists, and are considered to be merely accidental distensions of the coats of the veins in the part; I have however reason to believe that they are really Acephalocysts, as they develope gemmules, which are detached from the inner surface of the cysts. These are very small and globular, varying somewhat in size, the largest being visible to the naked eye like little opake points; their coats are transparent; they were most abundant upon that surface of the vesicle which was attached to the plexus; they existed in considerable numbers, and were readily detached from the parent vesicle.

The larger cysts were in many instances attached to the vein, but did not communicate with its cavity. In some the external coat of the vein appeared to have been expanded to form them. The fluid which they contained was coagulated by alcohol.

L.—*Observations on the Organogeny of the Flower, and particularly of the Ovary, in Plants with a free central Placenta.* By M. Gaudichaud†.

After some remarks on the state of organogeny at the present time, M. Gaudichaud gives the following brief summary of the principles of that department of botanical science:—

"1. All organization commences in the cell.

"2. Every so-called appendicular organ of vegetation and fructification results from a cell endued with vitality.

"3. The organized cell produces a bud of leaves, flowers or ovules.

"4. All pre-exists in every such bud; no fresh organization is added to it, any more than to the cell.

"5. The order of succession of the parts in the leaf- or flower-buds, as well as in the ovules, always takes place from the circumference to the centre.

"There are two great organic types in vascular vegetables, Monocotyledons and Dicotyledons. In Monocotyledons the cells always become endued with vitality one after another, one by another, to produce distinct univascular individuals, which obey an organogenic law yet unknown. This law, which regulates the deviations and arrangements, produces what we call verticils. The

† From a Report by M. Gaudichaud on a memoir of M. Duchartre bearing the above title, abstracted by A. Henfrey, F.L.S., from the 'Comptes Rendus,' Aug. 19, 1844.

verticils in these vegetables have for type of arrangement the number 3 and its multiples, and not the distichous alternation of the flabelliform organs, which should be their normal state.

"In the Dicotyledons the cells also become vivified one after another, to produce bivascular or double individuals, and naturally have for their normal type opposite organs, that is, the number 2 and its multiples. However, this group presents all imaginable modifications in its verticils, among which the number 5 predominates.

"It would be absurd, in my opinion, to imagine that, for instance, in Monocotyledons the organs originated in threes or sixes; or in Dicotyledons in threes, fours or fives, &c., arranged in more or less verticillated spirals: this is not the case. In Monocotyledons the organs are constantly simple, originating always one after another, becoming symmetrical in due time according to their peculiar organic laws, to be developed more or less directly together. In Dicotyledons the organs also originate separately, are constantly double, and are symmetrical in a special manner on account of this organic complexity. From the equality or inequality of force of the individuals which they compose, result all the organic modifications which are observed in stems, flowers, fruits, and in all parts which compose them; modifications which are commonly produced by deviation, mediate or immediate, grafting, complete or partial abortion of some of the phytons or their members. It will be seen that the mysteries of these abortions, &c. can only be explained when organogeny shall have unveiled the causes. We have not yet enough facts to generalize in a truly scientific manner, and prudence counsels us to wait.

"However, since the theory of the development of particular organs, produced by special cells, is not yet entirely demonstrated to the eyes of all *savants*; since the organic modifications, internal and external, which cells experience in becoming animated and converted into distinct cellular systems or protophytes, always grafted from their origin, by their base and more or less by their sides, verticil by verticil, are yet far from being demonstrated or even known; we shall only here provisionally consider the floral verticils as concentric cellular systems, distinct and variously tuberculated (*mamelonnés*), continuous one with another, but being formed or vivified one after another from the circumference to the centre, by defect or excess of the individual vitality of each verticil: this does not form one of our least arguments in favour of the theory of merithals."

These considerations, the whole responsibility of which the reporter (M. Gaudichaud) personally takes, seemed necessary here as an introduction to the following report on M. Duchartre's memoir.

"Several eminent botanists have been engaged for some years in the investigation of plants with a free central placenta, or in which the part which bears the ovules occupies the centre of the cavity of the ovary, without lateral attachments to its walls. Nevertheless this important question is not yet sufficiently settled; perhaps even, as M. Duchartre proceeds to prove, a wrong view of it is generally taken. This skilful botanist recollected that there was a safe means of deciding it in a positive manner, and that this means consisted, not in making multiplied observations on nearly full-grown flowers, as had most frequently been done, but in going back to the first origin of the parts, and following them in their formation and development; in a word, studying their organogeny.

"In fact, the advantage of this kind of research is easily understood, and what M. Schleiden says on the subject of the pistil may be applied to all the important parts of plants: 'The history of the development should be the sole guide, and it will conduct to a perfectly safe conclusion as soon as ever it is well understood in its generality.'

"One of the most remarkable investigations that have been made on free central placentas is that of M. A. de St. Hilaire. In this excellent memoir there occurs the following passage: 'If the placentas I have just described be observed before fecundation, it will be found that they are surmounted by a pretty firm *filament*, rather transparent, of a yellowish green colour, which penetrates the interior of the style; but, after the emission of the pollen, the ovules, beginning to increase in size, crowd round the *filament*, it breaks, and it is then only that the placenta becomes really *free*. The ovules, continuing to grow, cover the place which the filament occupied, and soon no vestige of it can be discovered.'

"The opinion of M. A. de St. Hilaire has been adopted by most botanists. Thus M. Endlicher, in the enumeration of the characters of the family *Primulaceæ*, says: '*Placenta basilari globosa, sessili vel substipitata, rarius columnari, primum filis arachnoïdeis cum vertice ovari cohærente, mox libera.*' Thus again, in the volume of the 'Prodromus' which has just appeared, M. Duby assigns a like character to the placenta of this same family: '*Placenta centrali globosa, apice filo cum interna styli substantia continua, mox libera.*'

"By these citations it is seen, that in the most important works the central placenta of *Primulaceæ* is described as being at first attached by its superior extremity to the summit of the ovary or to the style, and only becoming really free at a later period and by the rupture of its threads of communication.

"The author opposes this opinion, as well as that of Dr. Lindley, which appears to relate the organization of the placentas of *Pri-*

mulaceæ, to that of *Caryophylleæ*; he then enters upon the subject, and successively describes the organogenic characters he has observed in fresh specimens of *Primula veris*, cultivated variety with simple flowers of *Dodecatheon Meadia*, *Androsace lactea*, *A. filiformis*, *Cortusa Matthioli*, *Lysimachia Nummularia*, *L. nemorum*, *Lubinia spathulata*, *Anagallis platyphyllos*, *Samolus Valerandi*; and in dried specimens of *Hottonia palustris*, *Anagallis tenella*, *Glaux maritima* and *Lysimachia Ephemerum*.

"These plants presenting, with some slight modifications, the same characters, it will be easy to sum them up in a few words.

"At its first appearance the flower of the *Primulaceæ* shows itself in the form of a small globule, a little depressed, and entirely cellular. In this state it is embraced by the young bract, the axil of which it occupies. Very soon, towards the base of the nascent bud, a slight peripherical and continuous swelling is seen, the free border of which is speedily crimpled into five little festoons. This swelling is the nascent calyx, and the five little processes, the five organic sepals already soldered together. While the calycinal protuberance is making its appearance the young bud becomes a little enlarged, and five small rounded papillæ, alternating with the five sepals, are soon to be distinguished upon the upper part, now surrounded by the calyx. In a short time these papillæ become elevated, disengaged from the common base, and are to be distinguished as five small projecting bodies, rounded at the summit and sides, and slightly compressed within and without. These are easily recognised as the five stamens alternating with the divisions of the calyx, and consequently opposite to those of the corolla.

"The bud therefore possesses in this young state two of its verticils, the calyx and the male apparatus. The latter is already clearly enough marked, while nothing yet indicates there the appearance of the corolla; but from the time when the stamens are developed into little distinct bodies, if the calyx be removed, a slight swelling will easily be distinguished at their origin, on the outer side, which swelling follows the whole outline of their common base, and forms a well-marked projection outside each of them. The slight swelling is the nascent corolla, and the five little projections opposite to the stamens are the five organic petals which compose it.

"About the time when the corollary protuberance shows itself on the exterior of the base of the young anthers, the female organ begins to manifest itself as a kind of continuous circular swelling, in the centre of which is perceived a small rounded papilla. The swelling is the first indication of the ovarian parietes, and the papilla the first sketch of the placenta. At this period the young pistil organizes and developes its two portions equally.

"The peripheric swelling, rising more and more, quickly consti-

tutes a kind of little utricle with rather thick walls, truncated and open at the summit; while the placenta, elongating and growing proportionally, forms a small ovoid body which exactly fills the cavity of this young ovary, but without exhibiting the slightest adhesion to its walls. In this state it resembles a young solitary ovule.

"A new modification now soon presents itself and becomes more and more marked. The little ovarian utricle contracts as it increases in length; thus its orifice in a short time becomes elevated to the summit of a little truncated cone, which is the commencement of the style. At the same time the young placenta is a little contracted towards its free extremity, so that its form is now turbinated, and its point generally fills up the inferior opening of the styliferous canal. Its surface, which until then had remained smooth, quickly swells into little rounded papillæ which are the commencement of the ovules. These ovules in *Dodecatheon*, *Primula* and *Cortusa* are numerous and arranged spirally."

These facts, of which the commissioners (M. A. Brongniart, M. A. Richard and M. Gaudichaud) guarantee the exactness, sufficiently prove that in the *Primulaceæ* the placenta has a basilar origin; that it is developed as an internal verticil without any adhesion either to the walls or summit of the ovary; that it is there isolated like the nucleus of an ovule, or rather like a terminal spine; this evidently proves the spiral arrangement of the ovules, and still better, a little terminal flower perfectly formed, observed by M. Duchartre in *Cortusa Matthioli*.

This important memoir contains many delicate observations and curious facts, but as to give these would be to reproduce the memoir itself, the commissioners confine themselves to drawing attention to the capital fact of the free central placenta altogether independent of the walls and summit of the ovary, which is fully demonstrated, and to declaring that all M. Duchartre has described and figured is incontestably true.

LI.—*On the species of* Chalcidites *inhabiting the Arctic Region.*

By Francis Walker, Esq., F.L.S.

[Continued from p. 342.]

Encyrtus Cleone, fem. *Viridis, scutello cupreo, antennis pedibusque flavis, parapteris albis, alis limpidis.* (Corp. long. lin. $\frac{5}{4}$; alar. lin. $1\frac{1}{2}$.)

Body convex, bright green, minutely squameous: head large, transverse, slightly impressed in front, a little broader than the thorax: eyes round, red, rather large and prominent: ocelli form-

ing a triangle on the vertex: antennæ yellow, very slender, slightly increasing in breadth towards their tips, as long as the thorax; first joint very long and slender; second cyathiform; third very minute, hardly visible; fourth joint narrower than the second; fifth and following joints to the ninth successively increasing in breadth; club fusiform, fulvous, a little broader than the ninth joint, and more than twice its length: thorax oval: prothorax transverse, extremely short, hardly visible above: scutum of the mesothorax large, broader than long; parapsides forming one segment with the scutum, their sutures not visible; paraptera large, white; axillæ triangular, narrow, almost meeting each other on the dorsum; scutellum somewhat rhomboidal, cupreous, more shining than the scutum, narrower and abruptly decumbent behind where it forms a right angle: metathorax with the propodeon and podeon transverse, very short: abdomen bluish green, nearly round, much shorter and a little broader than the thorax; metapodeon large; octoon and following segments short: legs long, slender, pale yellow; tips of the tarsi fulvous; mesopedes dilated as usual: wings long, white; nervures fulvous; humerus shorter than half the length of the wing; ulna none; radius very short; cubitus much longer than the radius; stigma small, emitting no branch.

Found in the summer at Alten in Finmark.

Entedon Epigonus, *Monog. Chalciditum*, i. 112. Alten, Finmark.
——— Amyite, *Monog. Chal.* i. 65. Alten, Finmark.
——— Altadas, *Monog. Chal.* i. 70. Alten, Finmark.

Horismenus Clinus, mas. *Cupreus viridi varius, antennis nigris, pedibus viridibus, tarsis flavis, alis fuscis.* (Corp. long. lin. 1; alar. lin. $1\frac{3}{4}$.)

Body slender, convex, cupreous, tinged with green, shining: head and thorax finely punctured: head transverse, as broad as the thorax; vertex rather broad; front slightly impressed: eyes of moderate size, not prominent: antennæ 7-jointed, black, slightly setaceous, as long as the thorax; first joint long, stout, increasing in breadth from the base to the tip; second cyathiform, rather small; third and following joints broader than the 2nd; ninth joint longer and narrower than the sixth, acuminate at the tip: thorax oval: prothorax transverse, very short: scutum of the mesothorax rather large; sutures of the parapsides very distinct, approaching each other behind; axillæ small, not conniving; scutellum obconical: metathorax transverse, very short: propodeon large, obconical, declining: podeon short, stout: abdomen conical, depressed, smooth, not more than half the length of the thorax; metapodeon occupying rather less than half the dorsum; octoon and following segments to the telum very short: legs slender, green; trochanters, knees and protarsi fuscous; mesotarsi and metatarsi yellow, their tips fuscous: wings slightly fuscous, dark beneath the ulna; nervures piceous; humerus not more than one-third of the length of the wing; ulna longer than the humerus; radius very short; cubitus a little shorter than the radius; stigma small.

Alten, Finmark.

Omphale Ætius, Entedon Ætius, *Monog. Chal.* i. 78. Alten, Finmark.

Euderus Amphis, Entedon Amphis, *Monog. Chal.* i. 106. Alten, Finmark.

Tetrastichus Tyrtieus, Cirrospilus Tyrtieus, *Monog. Chal.* i. 306. Alten and Hammerfest, Finmark.

Tetrastichus Faucula, Cirrospilus Faucula, *Monog. Chal.* i. 310. Alten, Finmark.

Tetrastichus Lachares, Cirrospilus Lachares, *Monog. Chal.* i. 309. Alten, Finmark.

Tetrastichus Phineus, Cirrospilus Phineus, *Monog. Chal.* i. 303. Alten, Finmark.

Tetrastichus Idothea, fem. *Cyaneus æneo et viridi varius, abdomine cupreo aut purpureo, antennis nigris, pedibus fulvis piceo aut nigro cinctis, alis limpidis.* (Corp. long. lin. $\frac{3}{4}$; alar. lin. $1\frac{1}{3}$.)

Body slender: head and thorax convex, finely squameous: head transverse, blue, as broad as the thorax; vertex broad, æneous-green; front impressed: eyes of moderate size, not prominent: antennæ black, slender, slightly setaceous, as long as the thorax; first joint long, slender, slightly curved; second cyathiform; fourth and following joints successively narrower: thorax elliptical: prothorax transverse, very short: scutum of the mesothorax broad, blue; sutures of the parapsides distinct, approaching each other; scutellum obconic, æneous-green; axillæ not complete: metathorax very short: propodeon green, obconic, declining, of moderate size: podeon short: abdomen oval, cupreous, depressed above, slightly keeled beneath, rather shorter than the thorax; metapodeon green, of moderate size; octoon and following segments transverse, short: legs fulvous, slender; coxæ green; a broad piceous stripe across each thigh and tibia; tips of the tarsi piceous: wings limpid; nervures fulvous; ulna longer than the humerus; radius very short; cubitus rather longer than the radius; stigma very small.

Var. β. Thighs black.

Var. γ. Thighs black: abdomen purple, its base æneous.

Alten, Finmark.

Diglyphus Chabrias, Cirrospilus Chabrias, *Ann. Nat. Hist.* i. 451. Alten, Finmark.

Aprostocetus Catius, Cirrospilus Catius, *Monog. Chal.* i. 323. Alten and Hammerfest, Finmark.

Aprostocetus Anyta, Cirrospilus Anyta, *Ann. Nat. Hist.* iii. 417. Hammerfest, Finmark.

Dicladocerus Westwoodii, Eulophus Westwoodii, *Monog. Chal.* i. 157. Hammerfest, Finmark.

Eulophus Eucrate, *Monog. Chal.* i. 176. Hammerfest, Finmark.

Eulophus Idrieus, fem. *Viridis, abdominis disco purpureo, antennis nigris, pedibus viridibus, tarsis flavis, alis limpidis.* (Corp. long. lin. 1; alar. lin. $1\frac{3}{4}$.)

Body slender, green, shining: head and thorax convex, finely squameous: head transverse, not quite so broad as the thorax; ver-

tex broad; front slightly impressed: eyes of moderate size, not prominent: ocelli disposed in a triangle on the vertex: antennæ slender, subclavate, inserted near the mouth, shorter than the thorax; first joint long, slender, slightly curved; second joint cyathiform; third, fourth and fifth joints equal in size; club 2-jointed, conical, acuminate, longer than the fifth joint: thorax elliptical: prothorax transverse, very short: scutum of the mesothorax broad; sutures of the parapsides distinct; axillæ not complete; scutellum obconic: metathorax transverse, very short: propodeon large, obconic, declining, excavated lengthwise: podeon very short: abdomen oval, smooth, depressed above, keeled beneath, much shorter and rather broader than the thorax; the disc purple; metapodeon occupying about one-third of the dorsum; octoon and following segments to the telum transverse, short, nearly equal in size: legs green, slender; trochanters and protibiæ piceous; knees fulvous; mesotarsi and metatarsi yellow, their tips piceous: wings limpid; nervures pale yellow; humerus rather short; ulna longer than the humerus; radius very short; cubitus rather longer than the radius; stigma very small.

Alten, Finmark.

LII.—*Notice of some additions to the British Fauna discovered by* Robert MacAndrew, Esq., *during the year* 1844. By Professor Edward Forbes of King's College, London.

[With a Plate.]

Among the many additions to the British Fauna laid before the Natural History Section of the British Association at York, some of the most interesting were exhibited by Mr. MacAndrew of Liverpool, who, though he has comparatively lately joined the ranks of Natural History, promises to do good service to British Marine Zoology. His researches have hitherto been conducted chiefly on the western coasts, especially among the Hebrides, where there is doubtless a fine field for discovery as yet but partially explored. He has entrusted to me the description of the following animals, which appear to be new to the natural history of our country.

Mollusca.

1. *Emarginula crassa*, Sowerby, Min. Con. t. 33.

This is the largest European species of its genus and the most beautiful. Hitherto it has been noticed only as fossil.

The shell is ovate, about twice as long as high; the apex is subcentral and acute; the upper surface is sculptured by about forty radiating fasciculated ribs, each composed of four or five smaller ones, reticulated by close furrows of growth. The notch is broad and occupies about one-fourth of the fissural ridge, which is arched, slightly elevated, longitudinally striated and regularly and closely squamated; the internal cavity is smooth, and presents an elevated ridge with a central groove running from the sides

of the notch to the apex. The inner margin is undulated and toothed, the deeper impressions marking the compound ribs, the smaller those which are simple. The colour is white. The dimensions of the largest specimen are—

Length	$1\frac{5}{12}$ inch.
Breadth	$0\frac{11}{12}$.
Height	$0\frac{7}{12}$.
Apex to anterior margin	$0\frac{10}{12}$.
Length of notch	$0\frac{5}{24}$.

The animal is white, and resembles that of the other *Emarginulæ*. Mr. MacAndrew dredged this species in Loch Fine near East Loch Tarbet in 25 fathoms, also a single dead specimen off Skipnish near the entrance to Loch Fine. It would appear that Mr. Jeffreys had previously taken it in Loch Carron, and Mr. Alder procured it this year also on the west coast of Scotland.

As a fossil it has long been known. It occurs earliest in the coralline crag. The specimens from that deposit which I have seen are more conical and have fewer fasciculations in the ribs. In the red crag it also occurs, exactly resembling the recent examples. Mr. Lyell has found it in the pleistocene beds of Opslo near Christiania, associated with *Terebratula caput serpentis* (with which it now lives in Loch Fine). His specimens exactly resemble those obtained by Mr. MacAndrew, some of them however attaining a larger size, and being slightly broader in proportion to the length and a very little more convex in form. Their ribs are grouped in the same manner and as numerous. The inner surface of the shell is exactly similar. The sculpture is generally sharper, but this is also the case with the specimens of *Emarginula fissura* from the same locality, and depends on fossilization. The characters of the young shell, as exhibited by the apex of the fossil specimens and compared with the fossil examples of *E. fissura*, are evident and distinct, consisting in the greater length and more depressed form of the shell of *E. crassa*, the obtuseness of the apex, the manner in which the ribs are grouped, and the greater proximity of the striæ between them; also the greater breadth of the fissural groove and the consequent proportions of the slit. I mention these differences because Dr. Beck told Mr. Lyell that he regarded the two species as one. The *Emarginula crassa* would appear to be still living in the Scandinavian seas, as Mr. Cuming has recent specimens from Sweden.

I offer the following diagnosis as a summary of the essential characters:—

Emarginula (*crassa*). Testa ovata, alba, convexa, costis longitudi-

nalibus numerosis (40—43) fasciculatis, striis transversis approximatis cancellatis ; vertice subcentrali.

2. *Eulima MacAndrei.*

Eulima testa elongata, conica, recta, lævi, polita, lactea; anfractibus 10—12, angustis, planis, ultimo subcarinato; apertura angulata, subquadrata ; columella recta.

Length ..... $0\frac{7}{24}$.
Breadth of last whorl..... $0\frac{2}{24}$.
Length of aperture ..... $0\frac{1}{24}$.

This beautiful little shell differs from all its allies in the narrowness and number of its whorls. In shape it is elongated, straight and turrited; the whorls, which are ten or eleven in number, being very narrow in proportion to their length, flat, smooth, polished, and of a subpellucid white; the aperture is half the length of the body-whorl, broad and somewhat square; the pillar-lip is quite straight, and forms a marked angle to the mouth. The last whorl is subcarinated. Its nearest ally is the *Eulima Scillæ* of Scacchi, a species found fossil in the pliocene tertiaries of Sicily; but the living shell has much narrower whorls, judging from the figure of the fossil given in the second volume of Philippi's *Enumeratio*, t. 24. f. 6. It was dredged in 12 fathoms water in Loch Fine.

3. *Pleurotoma teres*, Forbes in Reeve Conch. Icon. pl. xix. fig. 161, and Report of the Cork Meeting of the British Association, p. 190.

When dredging in the channel called the Minch, midway between Skye and the mainland, in 40 fathoms water, Mr. MacAndrew procured a single specimen of a *Pleurotoma* which differs only in size (being larger) from a new species which I discovered on the coasts of Asia Minor, and which has been figured by Mr. Reeve. It is at once distinguished from all other British *Pleurotomæ* in the sculpture, the ribbing being spiral. It is a slender turrited shell of eight or nine terete, spirally ribbed whorls; the ribs are broad, rounded and smooth, the central ones having intermediate smaller ones; a broad crenated furrow runs round the summit of each whorl, bounding the suture. The ribs are about twelve on the last whorl, four or five on the others. The notch is sutural, broad and deep. The canal is long and slightly curved. The aperture is as long as the upper whorl. The apex of the spire is acute. The colour is yellowish white.

Dimensions :—Length ..... $0\frac{1}{2}$ inch.
Breadth ..... $0\frac{2}{12}$.
Length of last whorl ..... $1\frac{7}{24}$.
Aperture ..... $0\frac{5}{24}$.

4. A large *Natica,* which, if not distinct from *Natica monilifera,* has at least claims to be ranked as a marked variety of that species. It inhabits deeper water than the usual form, having been met with in various depths from 12 to 50 fathoms (off the coast of Wales). It wants the usual spots and markings of *monilifera,* has the upper margin of the whorls, especially in the older specimens, depressed or grooved, and above all is covered by an epidermis.

In other characters however it so closely resembles *N. monilifera,* that an observation of the characters of the animal (which is of great *specific* importance in this genus) will be required before we may pronounce with certainty on the specific value of the form.

Besides the above, Mr. MacAndrew has met with in the seas of the Hebrides the *Cyprina triangularis* of Montagu, the *Chemnitzia fulvocincta* (*Turritella,* sp.) of Thompson, and the *Pleurotoma Boothii* of Smith. The *Pecten Landsburgi* has also been met with by him in considerable numbers. It is the shell which Mr. Jeffreys named (but without a description) "*Pecten aculeatus*" in Sowerby's 'Malacological Magazine.' The *Pecten tigerinus* and the *P. striatus* of Muller appear to be identical with the two varieties of this species, and one of those names should be adopted for it on the ground of priority, as should Muller's *P. triradiatus* for our *obsoletus.* It is to be regretted that Mr. Jeffreys, who has been a most successful and enterprising collector of British Marine Testacea, does not make known from time to time his discoveries: *describing* such as are new, for mere names without descriptions cannot be admitted in any department of natural history, and only tend to confuse and mislead.

Echinodermata.

Mr. MacAndrew has taken in the Hebrides that remarkable creature, the *Holothuria squamata* of the 'Zoologia Danica,' an animal which will probably form the type of a new genus. I have not yet had time to examine structurally the specimens which he has put into my hands, and content myself for the present with the bare announcement of this important addition to the list of British animals. In a note from Mr. Alder, that gentleman informs me that it has also been taken on the Scottish coast during this summer by Mr. Jeffreys.

Zoophyta.

Pavonaria quadrangularis.

At the British Association I announced as new, under the name of *Virgularia quadrangularis,* a most remarkable Asteroid zoophyte dredged by Mr. MacAndrew on the west coast of Scotland.

I had formed my opinion from the skeleton, but from a more careful examination of a fine specimen which had been taken alive, and which Mr. MacAndrew entrusted to my care to convey to the British Museum, I have convinced myself that it is no other than the "*Pennatula quadrangularis*" of Pallas, first discovered and described by Bohadsch, and hitherto unknown in the Atlantic. It forms the type of Cuvier's genus *Pavonaria*.

The specimen in question is a slender, flexible rod, no less than 2 feet 6 inches in length, and consists of an acutely quadrangular calcareous skeleton invested with animal matter, consisting of a general integument and three series of sessile but exserted polypes arranged unilaterally, the position of the ranges corresponding to three of the angles of the stem. The animal matter in the dried state is of a yellow colour and the skeleton white. It was taken both dead and alive in 20 fathoms water off the island of Kerrera near Oban, the bottom being mud, in which it doubtless stands erect after the manner of *Virgularia*. Before a fuller description can be drawn up, specimens must be examined in the living state or preserved in fluid. In the meantime I offer the following remarks on the history of the species.

It was first described by Bohadsch in his interesting work 'De quibusdam animalibus marinis' (1761), who states that he procured it from the fishermen at Naples, who call it "*Penna del pesce pavone.*" He describes his specimen as 2 feet 10 inches in length, although broken short. He gives a rude figure taken from a living specimen. He describes the skeleton as friable, "ex pasta veluti farinacea compactum videtur."...."Os hocce quadratum, candidum, membrana lutescens, falso sapore donata immediate investit, quam cutis coriacea dimidiam circiter lineam crassa undique circumdat. Inter utramque membranam in vivo animali quemdam humorem continerit, atque formam totius *Pennæ* cylindricam esse opinor, et quidem ex eo, quod *Pennæ rubræ*, &c. mortuæ et exsiccatæ truncus quoque aliter configuratus sit, quam in Penna viva observetur" (p. 112). He states that the polypes have eight white, not very prominent tentacula, and are arranged on three sides of the trunk. In 1766 Pallas gave a diagnosis of this zoophyte under the appropriate name of *Pennatula quadrangularis* in his 'Elenchus Zoophytorum,' adding the remark, "vidi fere bipedale." Subsequent authors seem to have described it at second hand. Ellis gave a copy of Bohadsch's figure in the 53rd volume of the 'Philosophical Transactions,' as "Dr. Bohadsch's sea pen, called the pen of the peacock fish" (t. 20. fig. 7, 8). In the work of Solander and Ellis it is recorded as *Pennatula antennina*, as also in Gmelin. Lamarck made it a species of his genus *Funiculina*, an assemblage of three dissimilar zoophytes, styling it *Funiculina tetragona*. Cuvier constituted the genus *Pavonaria*

for its reception. De Blainville adopted the genus, modifying the character as follows:—

"Animals polypiform, sessile, not retractile, provided with eight pinnated tentacula, arranged quincuncially on one side only of the posterior half of a free, regular, quadrangular and much elongated rachis." (Actinologie, p. 516.)

This genus appears well-founded, and the species will accordingly stand as *Pavonaria quadrangularis* (sp.), Pallas.

In Loch Fine Mr. MacAndrew dredged a fine specimen of the remarkable and rare zoophyte known to British naturalists as "*Zoanthus Couchii*." It has not hitherto, as far as I am aware, been noticed on the Scottish coasts.

All the above-mentioned animals were exhibited to the Natural History Section at York. It is very desirable, since most of the naturalists engaged in the investigation of the indigenous fauna and flora are members of the British Association, that from year to year new and rare forms of British animals and plants should be brought forward at the annual meetings of that body, and so be rendered familiar to many who might not otherwise have an opportunity of examining them. The chief interest of the Section will always depend on the meeting of the practical investigators of the zoology and botany of the British Islands, and of the statistics of natural history, with those naturalists whose attention is directed to the philosophy of the science and to the investigation of structural and physiological questions. This has been the character of the Section during the last two meetings, and promises happily to be permanent and to be the means of elevating the reputation of this department of British science among our continental brethren, who a few years ago were not much inclined to admit the probability of our going ahead in the higher branches of biological science. The more suggestive the character of the meetings of Section D. is rendered, and the less there is of frivolous disputes as to who first named this species or who named that, without reference to structure, habits, law and locality, the better.

EXPLANATION OF PLATE XI. UPPER FIGURES.

1. *Emarginula crassa.*
2. *Eulima MacAndrei.*
3. *Pleurotoma teres.*

LIII.—*Descriptions of some new Species of Butterflies in the Collection of the British Museum.* By Edward Doubleday, Esq., F.L.S.

Genus Papilio.

P. Photinus. Alis omnibus nigris, cæruleo-micantibus, posticis dentatis, serie duplici macularum chermesinarum, ciliis omnibus albo-maculatis. Expans. alar. 3½ unc.

Above.—Anterior wings black, the apex fuscous, the disc and

inner margin with blue and green reflections. Posterior wings dentate, the third tooth prolonged into a short tail, the whole surface with brilliant blue and green reflections. Beyond the discoidal cell is a series of six crimson, rather rounded spots, the first, second and fifth smaller than the others, followed by a second series of markings of the same colour, of which the first is quadrate, the four others lunulate. Cilia of all the wings spotted with white.

Below.—Anterior wings olivaceous, the disc fuscous. Posterior wings greenish olive, with the crimson markings nearly as above, but slightly bordered with black, and in addition two crimson streaks at the anal angle bounding a fuscous spot.

Head black, palpi crimson, thorax and abdomen black, the sides below spotted with red.

Female fuscous, the markings on the posterior wings larger and paler, a long dull red spot at the anal angle.

From the west coast of America, probably Mexico.

P. Pyrochles. Alis omnibus nigris anticis olivaceo-micantibus, macula trigona glauca, posticis maculis tribus coccineis, splendide opalescentibus. Exp. alar. $3\frac{1}{4}$ unc.

Above.—Anterior wings black, glossed with shining olive, marked on the inner margin near the base with a trigonate glaucous spot not quite attaining the discoidal cell. Posterior wings deep black, with three brilliantly opalescent crimson spots between the branches of the median nervures, of which the outer is rounded, the others much larger and oval. All the cilia spotted with white.

Below.—Fuscous, anterior wings with a few glaucous scales between the second and third branches of the median nervure. Posterior wings with the same marking as above, but of a pinkish white crimson posteriorly, and between these and the anal a large pale and a small deeper red spot.

Head black, palpi crimson, thorax and abdomen black, the sides below spotted with crimson.

From S^{ta} Fé de Bogotá.

P. Cymochles. Alis anticis fuscis, basi nigris macula magna glauca in qua maculæ duæ albæ; posticis nigris, macula palmata coccinea perpulchre opalescente. Exp. alar. vix 3 unc.

Anterior wings fuscous, the base and inner margin black, marked with a large trigonate glaucous spot extending to the discoidal cell, marked at its upper angle with a dull white spot divided into two by the second branch of the median nervure. Posterior wings black, brilliantly shaded with blue along the abdominal fold, marked on the disc with a palmate crimson opalescent spot divided into six portions by the nervures, one small within

the cell, four others resting on the branches of the median and on the radial nervure, the outer of these small, the others successively larger, except the last, which is almost linear. Cilia all spotted with white.

Head black, palpi and occiput red. Thorax black, with a red collar below spotted with red. Abdomen fuscous, two spots on each side near the base, and margin of last segment below red.

From Trinidad.

P. Mezentius. Alis omnibus nigris fascia communi maculari albida, posticis dentatis, caudatis, maculis discoidalibus, lunulisque marginalibus rufis. Exp. alar. 4 unc.

Above.—Anterior wings black, with a narrow macular whitish band commencing indistinctly upon the costa, traversing these wings considerably *beyond* the discoidal cell, and terminating on the disc of the posterior wings, where the last spot is divided into three parts by the disco-cellular and the last branch of the median nervure. Posterior wings black, sprinkled beyond the middle with a few bluish scales, deeply dentate, the third tooth from the anal angle prolonged into a long spatulate tail, marked, in addition to the white fascia, with three somewhat rose-coloured spots placed transversely between the abdominal margin and the termination of the macular band, which is here slightly tinted with rose-colour. Beyond these are three lunules of the same colour, one above the anal angle, the others close to the margin, between the first, second and third branches of the median nervure, succeeded by two sigmoid red spots, and near the anal angle by a whitish one. Anal angle itself red. Cilia white, except at the extremity of the dentations.

Below paler than above, and in addition to the markings of the upper surface there is a narrow white line near the outer margin of the anterior wings, extending from the fourth branch of the median nervure to the anal angle, and on the posterior wings an indistinct macular flexuous white band preceding the marginal series of lunules and spots.

Head black; palpi yellow; thorax black, spotted below with yellowish; abdomen fuscous, with a yellowish lateral line.

From the west coast of America (probably of New Granada or the Ecuador). Closely allied to *P. Hectorides*, but may be easily known from it as the macular white band begins nearer the apex of the anterior wings, crosses the wing at *some distance beyond* the discoidal cell, and is continued nearly in a direct line to the disc of the posterior wings, only a slight portion being within the discoidal cell.

P. Victorinus. Alis omnibus supra nigro-olivaceis, apice fuscis, serie duplici macularum flavarum, subtus, maculis posticarum rufis. Exp. alar. 5 unc.

Anterior wings above black, tinged with olive, the posterior margin with a series of eight rounded yellow spots, the first indistinct, the last double, preceded by a curved series of yellow spots, interrupted opposite the discoidal cell, composed of a longitudinal streak on the costa, three rounded spots between the branches of the median nervure followed by a lunular, and on the inner margin by an elongate one, all of a yellowish colour.

Posterior wings dentate olive-green, with a series of seven rounded spots beyond the discoidal cell, followed near the margin by a series of six lunules, and at the outer a round spot all yellow; cilia spotted with white.

Below.—All the wings, the anterior with the disc fuscous, the outer series of spots vanishing towards the apex, the inner series more marked than above, with two additional spots opposite the discoidal cell, in which is a large yellow spot divided by a longitudinal black line.

Posterior wings with the spots and lunules red, the inner series smaller than above and edged with black.

Head black, orbits behind and base of palpi yellow. Thorax black, with a yellow spot on each side above anteriorly. Abdomen fuscous.

From the west coast of America.

This species is closely allied to *P. Cleotas, Grayi,* and *Phaëton,* Boisd.

Genus Euterpe.

Eut. Hylonome. Alis omnibus nigris, anticis supra fascia transversa alba, posticis subtus pallide roseis nigro striatis. Exp. alar. 1 unc. 9 lin.

Above.—Smoky black, anterior wings with a transverse fascia near the middle divided by the nervures, not reaching either the costa or inner margin.

Below.—The anterior wings are marked as above, the posterior are more coloured at base, paler towards the apex, the nervures and a vitta between each two nervures black, the black predominating on the margin and just beyond the discoidal cell.

Head, thorax and abdomen black.

From S^{ta} Fé de Bogotá.

Genus Leptalis.

Lept. Cyra. Alis omnibus nigris, anticis vitta longitudinali, fasciaque transversa flava, posticis vitta discoidali flava. Exp. alar. 1½ unc.

Above.—Anterior wings black, with a curved longitudinal pale yellow vitta beginning at the base and terminating not far from

the anal angle, and a rather broad transverse band of the same colour beginning on the costa beyond the discoidal cell and terminating near the middle of the outer margin. Posterior wings black, the disc traversed by a broad pale yellow vitta which extends from the base nearly to the outer angle; the costa is of a neutral tint, furnished in the males with a long tuft of hair as in the *Heliconians*.

Below.—All the wings black, the markings as above, with the addition of a marginal series of small white spots, preceded by a narrow ferruginous line broken on the anterior wings. The base of the posterior wings has a yellow vitta on the costa.

Head black; thorax above ferruginous, below black; abdomen above black, below yellow.

Lept. Eunoë. Alis anticis falcatis nigro-fuscis, vittis duabus basalibus longitudinalibus maculaque bifida aurantiacis, fasciis duabus macularibus obliquis apiceque flavis, posticis aurantiacis fimbria lata nigro-fusca maculis tribus apicalibus flavis. Exp. alar. 3 unc.

Anterior wings falcate, the base with a longitudinal orange vitta in the cell and a narrower one on the inner margin, at the extremity of which is a spot bifid anteriorly, of the same colour. Beyond there is a transverse yellow macular band, composed of five spots surrounding a square black patch placed on the discocellular nervure and of a large oval spot beyond. This band is followed by another, composed of a spot on the costa divided into three parts by the nervures, and of two approximating oval ones beneath it. The apex itself is yellow with the nervures fuscous. The outer margin is tinged with brown. Posterior wings large, orange, with a broad fuscous fimbria shading to brown on the margin itself, and marked at the apex with three yellow spots.

Below.—Anterior wings nearly as above but paler, the two vittæ and the orange spot confounded together; the apex with some small white clouds. Posterior wings brown, the disc clouded with yellow, the posterior margin, especially towards the apex, freckled or clouded with white.

Head and thorax grayish; abdomen fuscous above, beneath yellowish.

From Mexico. Collected by M. Th. Hartweg.

Lept. Praxinoë. Alis anticis falcatis fuscis, vittis tribus basalibus longitudinalibus aurantiacis, fascia obliqua maculari aurantiaca alteraque flava, posticis umbrino, nigro, aurantiacoque vittatis. Exp. alar. 3 unc.

Anterior wings falcate, fuscous, paler towards the outer margin; the base with three longitudinal orange vittæ, one on the costa, one on the inner margin, the intermediate one extending along both sides of the median nervure a little beyond its first branch,

and occupying a large portion of the space between the first and second branches nearly to the anal angle. Beyond the discoidal cell is an oblique fascia composed of a long orange spot divided by the nervures, preceded by a quadrate and followed by an oblong spot, partly orange, partly yellow. Between this and the apex is a second macular band composed of a quadrate spot on the costa, two large oval ones and a small rounded one near the outer margin. Posterior wings elongate-oval, the costa and posterior margins brown, the disc orange, bordered above and below by a black vitta; these vittæ unite at the apex so as to inclose the orange entirely. Base of the wing with a small yellow dash.

Below.—The anterior wings are marked as above, but are broadly umber-coloured towards the apex, where there are a few white freckles. The posterior wings are umber-coloured, with an imperfect yellow vitta below the cell, followed by some dark clouds; apex with indistinct fuscous and yellow clouds and irregular white freckles.

Head black; antennæ pale; thorax and abdomen above black.

From Mexico. Collected by M. Th. Hartweg.

Lept. Medora. Alis omnibus nigris, anticis emarginatis, fascia transversa, maculis duabus apicalibus, alteraque marginis interioris flavis, posticis disco flavo. Exp. alar. $2\frac{1}{4}$ unc.

Above.—Anterior wings slightly emarginate near the anal angle, black with a transverse yellow band beyond the discoidal cell, commencing on the costa and extending nearly to the anal angle, between which and the apex are two rather rounded yellow spots placed transversely, the anterior the smaller, and on the inner margin, beyond the middle, a short dash of the same colour. Posterior wings broad with the disc yellow, the abdominal and outer margins broadly black; the costa of a satiny ash-colour, marked with a large chalky-white spot.

Below.—All the wings yellow, with a large brown spot near the middle of the costa, and a transverse band of the same colour extending from the costa to the outer margin; the inner margin broadly satiny-ash with a large chalky-white spot, corresponding to the markings on the costa of the posterior wings above. Posterior wings yellow, with a large irregular brown patch beyond the middle, a smaller one of the same colour near the outer angle, and an indistinct narrow brown band extending from the abdominal margin near the anal angle towards the middle of the wing.

Head gray; thorax and abdomen above black, beneath gray.

From S^{ta} Fé de Bogotá.

This species, with every other character of the true *Leptalides*, has apparently the discoidal cell of the anterior wings open.

Genus Pieris.

Pi. Marana. Alis omnibus supra albis, marginibus late nigris, subtus nigro-brunneis anticis fascia obliqua, margine interiori late albis, posticis vittis duabus latis albis, duabusque angustis rufis. Exp. alar. 2 unc.

Above.—Male with the anterior wings white, the outer margin with a broad dentate black border, the costa narrowly black; posterior wings white, with a black border of nearly uniform width, not distinctly defined.

Below.—The anterior wings fuscous, with a large white patch occupying nearly the whole of the inner margin and extending into the cell. Immediately beyond the cell is an oblique white band commencing close to the costa and terminating in a point near the middle of the outer margin. Posterior wings fuscous, the base occupied by a broad white band; a similar band commences on the inner margin about the middle and terminates in a point without reaching the outer angle. This band is preceded by a ferruginous streak extending from the inner margin across the discoidal cell, and on the costa at the base is a streak of the same colour.

Female above fuscous, the markings nearly as on the lower surface of the male, but the red streaks are wanting, and the black of the outer margin extends more along the inner margin of the anterior wings, and the white bands of the posterior are rather narrower. The under surface resembles the upper, but is rather paler, and has the same red streaks as in the male, with the addition of a red cloud at the inner and outer angles.

Head, thorax and abdomen above black, below whitish.

From the west coast of America, probably Guayaquil. Closely allied to *P. Amathonte*, but much smaller.

Pi. Chione. Alis omnibus supra margaritaceo-albis, anticarum apice fusco, subtus anticis margaritaceo-albis, posticis flavescentibus, omnibus margine exteriori flavo corticinoque vario.

Above of a beautiful pearly-white, the apex of the anterior wings narrowly fuscous, the apex of the posterior with two fuscous spots.

Below.—The anterior wings are pearly-white, the base and costa slightly tinted with yellow, the outer margin varied with yellow light ground and pearl-coloured clouds. Posterior wings very pale yellow, with a black streak on the disco-cellular nervure, the margin broadly clouded with the same colour as that of the anterior wings, the brown extending nearly to the cell.

Head, thorax and abdomen white.

From Sierra Leone. Closely allied to *P. Pharis.*

LIV.—*Descriptions of some new species of Coleoptera and Homoptera from China.* By Adam White, Esq., M.E.S. Lond. and France.

In a small collection of insects sent to the British Museum by John Bowring, Esq., and collected by him in the island of Hong Kong, occur the species described below. In a letter Mr. Bowring remarks: "I have been much surprised at finding that there is so great a difference between the insects on this island and those on Macao Peninsula, a difference for which it is difficult to account, in places so close to each other (Macao is only 40 miles off). The climate here is certainly damper, and the character of the land much more rocky and clayey. Macao is chiefly a sandy soil."

Cicindela posticalis.—A species nearly allied to *Cic. analis*, Fabr., from which it may be distinguished by its thorax being more globular; the elytra want the depression about the middle, which gives to *analis* a velvety-like mark on that part; in this the terminal segments of the abdomen, instead of being rufous, are of a deep blackish blue; in other respects it resembles *C. analis*, Fabr., of which it may prove a local variety. Length $6\frac{3}{4}$ lines.

Hab. Hong Kong; John Bowring, Esq.

Tricondyla pulchripes.—Of a deep black, the elytra with a greenish bronzed tinge. Head smooth, the peduncles from which the eyes project with several fine striæ. Thorax considerably elongated, with a faint impressed line down the middle and an arched line on each side; between the arched lines are many fine but very distinct slightly waved transverse lines which run into each other; the sides of the thorax are quite smooth. Elytra punctured at the end, at the base rugose, and about the middle transversely but irregularly lineated, with deep dots in the lines, which give these parts the appearance of being scaled. Legs, especially the femora which are more lightly coloured, with a fine purplish tinge. Length 8 lines.

Hab. Hong Kong; John Bowring, Esq., who sent me the sketch.

Helluo (*Acanthogenius*) *asteriscus.*—Head, thorax and elytra deeply punctured, rather hairy, and with the legs of an obscure pitchy black; the large labrum is smooth and polished. Elytra with nine striæ, the interval between the eighth and ninth having a row of large papillated points; third, fourth, fifth, sixth and

seventh intervals of striæ with a yellow spot about the middle, that on the fifth elongated. Length $6\frac{1}{2}$ lines.

Hab. Hong Kong; John Bowring, Esq.

This makes the tenth species of the subgenus *Acanthogenius* characterized by M. Reiche in the 'Annales de la Soc. Ent. de France,' 1842, p. 334.

Sisyphus Bowringii.—A very striking species, at once distinguished by a long, slightly bent, bluntish spine attached to the coxa of the hind-leg, if it be not an elongation of the coxa itself; it is equal to the femur in length. This spine is slightly compressed, thickest at the base; about the middle it suddenly begins to be attenuated to the end, which is somewhat flattened and bent.

Head in front slightly sinuated and notched on each side of the clypeus. Thorax very convex, in front angled, the sides compressed and ridged above, the surface above seemingly rough with short, somewhat distant bristly hairs, each proceeding from a round smoothish spot. Elytra with seven longitudinal, smooth, chain-like impressed lines on each; two rows of distant short bristles between each line. Anterior tibiæ with three strong bent teeth on the outer edge. Femora of middle pair of legs with a bluntish tooth on the inside near the base. Femora of hind-legs most dilated a little beyond the middle; tibiæ of same pair much bent (a male) and slightly serrated inside near the end; an elevated subserrated ridge on each side; the different ridges, especially those behind, furnished with reddish hairs. The whole insect is of a slightly greenish bronzed brown, the legs most clear. Length to the end of body $5\frac{3}{4}$ lines.

Hab. Hong Kong; John Bowring, Esq.

I have much pleasure in naming this fine species after Mr. Bowring, who promises to extend very much our acquaintance with the insects of China.

Onthophagus bifurcalis.—Head with a long flat ascending appendage proceeding from about the middle and deeply forked at the end, with slightly diverging prongs, and when the head is raised nearly approaching the thoracic projection, which at the end is depressed, dilated and notched, the back of it grooved; the thorax behind has a very distinct dorsal groove, in front, at the base of the projection, bulging and not hollowed out as in *O. mergacerus*, Hope; thorax finely punctated and of a deep brown with greenish and purplish reflections. Elytra of a yellowish brown, ribbed, three of the costæ somewhat elevated, the interlineations punctate, in some specimens the dots scarcely visible; clypeus and legs pitchy brown; tibiæ of fore-legs with four strong teeth, the hind one obsolete; femora of fore-legs margined with

hairs, intermediate and hind-legs bare; tarsi of hind-legs with two double spines behind about the middle (♂). Length 5½ lines.

Hab. Hong Kong; John Bowring, Esq.

A species near the *O. mergacerus*, Hope, Gray's Zool. Misc. p. 22.

Onthophagus taurinus.—Head punctate, purplish brown, shining, in front somewhat pointed and turned up, behind the eyes on each side dilated into a slightly curved horn projecting outwardly. Thorax thickly punctured, greenish brown, slightly glossy; sides in front yellowish, in the middle in front narrowly hollowed out, the sides of the hollowed part pinched up. Elytra costate, at the base yellowish, and four of the costæ yellowish, this colour being continued to the tip: podex yellow. Legs of a pitchy yellow, more or less hairy. Tibiæ of fore-legs with four blunt teeth, the hind tooth obsolete; tibiæ of hind-legs scarcely toothed behind. Length 3½ lines.

Hab. Hong Kong; John Bowring, Esq.

Onthophagus suturalis.—Head smooth, in front blunt and slightly turned up, in the middle behind with a dilated appendage suddenly attenuated about the middle and bluntish at the end. Thorax closely punctate, of a greenish bronzed brown; in the middle in front slightly excavated; the sides of the hollowed part above project slightly and form a small knob; thorax behind in the middle longitudinally impressed. Elytra yellow, suture black, a transverse wide black band interrupted in the middle, the lateral part of the band emitting a narrow black line which falls into the base at the middle: podex bronzy brown. Legs obscure, more or less hairy. Length 3¼ lines.

Hab. Hong Kong; John Bowring, Esq.

Hoplia squamacea.—Head, thorax, elytra and podex covered with pale yellow shining scales; under side of body covered with similar but somewhat paler scales, those on the side with a pinkish hue. Legs ferruginous with several hoary scales and hairs. Length 3⅝ lines.

Hab. Hong Kong; J. Bowring, Esq. A species near the Nepalese *Hoplia squamigera*, Hope, in Gray's Zool. Misc. p. 24.

Hoplia elegantula.—Covered with ochrey-coloured scales of different hues mixed with hairs. Labrum of a dark pitchy brown. Scales on the head of a pale yellow. Thorax on the middle with two widish nearly parallel lines of a darker hue than the rest of the thorax, as are a large clouded spot on the basal half of each elytron, and a large irregular but well-defined mark between that and the tip; the hairs on the elytra run in six or seven longitudinal lines. Under side of body covered with very pale yellow scales, but devoid of hairs. Legs ferruginous with greenish scales and hoary hairs. Length 3 lines.

Hab. Hong Kong; J. Bowring, Esq.

Adoretus cribratus.—Pale brown, slightly metallescent. La-

brum with a very distinct transverse keel. Elytra very indistinctly ribbed, and with the head and thorax covered with minute punctures, some of them confluent; grayish hairs proceed from each dot. Length $5\frac{1}{4}$ lines.

Hab. Hong Kong; John Bowring, Esq. A species near the *A. boops* and *ranunculus*, described by Burmeister in his 'Handbuch,' iv. 474.

Saperda (*Isoscelis*) *nigriceps*.—Fulvous. Head, antennæ and end of abdomen black. Head fulvous behind, a narrow smooth line running down the middle and terminating before the forehead, the other parts closely punctured. Elytra with six lines of large punctures, the end blackish and abruptly cut off, the sutural angle almost spiniform. Legs and under parts entirely fulvous. Length $7\frac{3}{4}$ lines.

Hab. Hong Kong; John Bowring, Esq.

This comes near the *Saperda seminigra*, Chevrolat, from the Philippine Islands, described in the 'Rev. Zool. Cuv.,' and belongs to the genus *Isoscelis* of Newman, 'Entom.' p. 319. The *Saperda elongata*, Hope, from Nepal, is closely allied to it.

Podontia lutea, Dej. Cat. 419; *Chrys. lutea*, Oliv.; *P. grandis*, Grönd. Dalm. Eph. Ent. i. 23.

Hab. Hong Kong; J. Bowring, Esq.

Platycorynus bifasciatus, Dej. Cat. p. 437; *Eumolpus bif.*, Oliv. Col. t. 1. f. 5. vol. vi. p. 900. no. 7.

Hab. Hong Kong; J. Bowring, Esq.

Homoptera.

Fulgora (*Pyrops*) *Lathburii*, Kirby, Linn. Trans. xii. 450; Guérin, Icon. R. A. t. 58. f. 2.

Hab. Hong Kong; John Bowring, Esq.

Note on *Fulgora candelaria*:—Mr. Bowring, in the letter from which I have quoted before, remarks: "I have been keeping a number of *Fulgoræ* to endeavour to find out if there were any truth in the commonly received idea, that they emit light at night or in the dark. The insect is very common here; I have seen as many as a score in an evening; but though I have brought many of them home, I have not been able to discover any luminous property in them. It would not perhaps be right to say that they do not possess it because I have not seen it, as one well-authenticated case would prove the contrary, though in a thousand others no light may have been observed. I find that they become very active and restless towards night-fall, and they fly much better than would be expected from their somewhat clumsy shape. If the rostrum be crushed or bent it soon recovers its original shape, —if the insect be alive I mean."

Ledropsis.—Head with its prolongation longer than wide, in front of the eyes parallel and as wide as the thorax, then

gradually curved to the tip, which is somewhat obtuse; ocelli on the same line with the front of the eyes, and rather more distant from each other than they are from the eyes. Eyes large, but not very prominent; prolongation hollowed out beneath, with a spear-shaped elevated ridge running down the middle, the base of which, on the face between the eyes, is hollowed out. Antennæ spring from a depression in front of the eyes beneath, 3-jointed, the terminal joint ending in a longish bristle. Thorax rounded in front, very deeply notched behind, the posterior angles truncato-rotundate. Hemelytra with many inclosed cells at the end, the nervures strong. Body elongated, beneath margined. Tibiæ of hind-legs not dilated, serrated behind.

A genus closely allied to *Ledra*.

The species (*L. Cancroma*) is of a dingy yellowish brown, under side of head pitchy brown; legs and antennæ yellowish; head covered with small papillæ; thorax and hemelytra thickly punctured. Length 8 lines.

Hab. Hong Kong; John Bowring, Esq.

Mr. Bowring has sent two species of *Cercopis*; one of these is very common in collections from China, but seems to be hitherto undescribed.

Cercopis heros, Fabr. Syst. Rhyng. 89. 3.

Hab. Hong Kong.

Cercopis bispecularis.—Of a lively red; thorax in front for the width of the head black, two large spots on the back also black. Hemelytra with two wide irregular transverse bands and the whole of the tip black, the under side of the thorax is blackish. Length 7 lines.

Hab. Hong Kong; John Bowring, Esq.

Two species of *Cicada* are in the collection from Hong Kong: one of these is *Cicada* (*Huechys*) *sanguinea*, DeGeer, Mém. iii. t. 33. f. 17; Serville and Amyot, Hemipt. p. 465. *Tettigonia sanguinolenta*, Fabr. Syst. Rhyng. 42. 46.

Hab. Hong Kong.—The other I call

Cicada (*Mogannia*) *nasalis*.—Head, thorax and body covered with fine silky yellowish brown hairs, most abundant on the upper side. Near the base of the hemelytra there is a broad transverse band (widest interiorly) of a glossy yellowish hue, darker on the edges, the veins greenish, base and tip quite clear. Wings with the veins obscure, the inner edge reddish. Prothorax with two large rounded spots, one on each side; the margin and a line through each spot deeply impressed. Tibiæ of the hind-legs hairy behind, with three longish spines on the apical half. Length $10\frac{1}{2}$ lines.

Hab. Hong Kong; John Bowring, Esq.

A species quite distinct from the *Mogannia illustrata*, Serville and Amyot, Hemipt. p. 467. t. 9. f. 4.

BIBLIOGRAPHICAL NOTICES.

A History of British Ferns and Allied Plants. By Edward Newman, F.L.S., Z.S., &c. 8vo. London: J. Van Voorst, 1844.

We had delayed noticing this elaborate work in the hope of having had it in our power to study some of the controverted plants described in it in their native localities; as however fortune has not favoured us in that respect, not having seen those which we most desired to investigate during any portion of an extensive summer tour, we are compelled to sit down with dried specimens alone before us to examine, with their aid and that of our previous observation, into the correctness of the conclusions at which Mr. Newman has arrived. Before however we commence, it is a great gratification to have it in our power most cordially to recommend the work to all those who desire to obtain a knowledge of British Ferns, as one which, in accuracy of observation, elaborateness and clearness of description, and beauty of illustration, does not possess its equal.

The numerous and considerable changes in nomenclature and in the rank awarded to many of our ferns in Mr. Newman's former work under the above title, and the very considerable alteration which he has again made in those respects in that now before us, which differs so much from its predecessor as deservedly to claim to be considered as a distinct work rather than an edition, have rendered it difficult and somewhat presumptuous in us to venture an opinion upon them; as however we learn that such a review is expected, and editors are always supposed to know all about whatever may come under their critical eye, and that we feel that we really do know something concerning the subject now under consideration, we shall proceed boldly to the examination of the contents of Mr. Newman's book in the order in which he has arranged them. It seems to us that such a review is far more desirable in the present case than a connected dissertation upon our native ferns, such as has been suggested to us, than in short a history of British ferns by us, and not an examination of that by Mr. Newman.

We commence with the *Equisetaceæ*, including the genus *Equisetum* alone, where two difficult questions occur: first, as to the distinctness of the plants named *hyemale*, *Mackaii* (*elongatum*, Hook.), and *variegatum*; and secondly, concerning the nomenclature of the other species. On the former of these subjects Mr. Newman has collected together an immense mass of evidence, and we think that he has clearly shown that three at least are distinct species. It is nevertheless very difficult to draw up such a character upon paper as shall always suffice for their discrimination, most if not all their distinctions being liable to considerable variation, and probably the colour of the sheaths is that upon which most reliance may be placed. The shape of the teeth which terminate the sheaths is far from constant. Our author has clearly shown that *E. Mackaii* (Newm.) is not the same as *E. elongatum* (Willd.), a plant apparently identical with the *E. ramosissimum* (Desf.), and has therefore con-

ferred a new name upon the Irish species in compliment to Mr. Mackay, the distinguished investigator of Irish botany, whom he had been led to consider as its original discoverer; it now however appears that it was detected by the late Mr. Templeton long previously to its attracting the notice of Messrs. Whitla and Mackay, and ought therefore, according to the rules for correct nomenclature, to be called *Mackaiana* in place of *Mackaii*. It should however be observed that Vaucher, although quoting Willdenow's *E. elongatum* as a probable synonym of *E. ramosissimum* (Desf.), in which doubtless he is correct as far as the European localities are concerned, describes and figures another species as *E. elongatum* (Willd.), to which he refers the extra-European stations recorded by that botanist. This latter plant very closely resembles *E. Mackaii*, and is perhaps what Sir W. J. Hooker had in view when conferring the name of *E. elongatum* upon the Irish specimens; it is however quite distinct, as may be seen by comparing Vaucher's description and figure with our plant. We suspect that several species will ultimately be found to be included under the name of *E. variegatum*, although sufficient data have not as yet been obtained to allow of their separation upon paper. The upright aquatic plant which has now been observed in many places presents a very different appearance from the prostrate inhabitant of loose and dry sands, and Mr. Moore has found them to continue distinct in that respect, even when cultivated in a precisely similar manner. It would appear that the name of *variegatum* belongs by right to the plant of freshwater marshes, having been first employed for a described plant by Weber and Mohr in 1807. If our sea-shore plant, the *E. variegatum* of Smith, should prove distinct, the excellent name of *arenarium* is already provided for it. There is still another plant which may ultimately be separated from this species which was found by Mr. W. Wilson in the lake at Mucruss near Killarney; this is upright, tall and stout, has a much smoother stem, and apparently a differently shaped internal hollow. We have not seen it, but should it prove distinct from the true *E. variegatum* of fresh water, it will justly claim the appellation of *E. Wilsoni* conferred upon it by Mr. Newman.

Concerning the specific distinctness of the remaining species of *Equisetum* there appears to be no difference of opinion; not so upon their names. The *E. limosum* of English authors is called *fluviatile* by Newman, considering the *limosum* and *fluviatile* of Linnæus as only varieties of the same species, and in this he is borne out by the Linnæan herbarium. Indeed we have no doubt that the *E. limosum* (Sm.) is the original *E. fluviatile* (Linn.), but it seems equally certain that Linnæus afterwards included *E. Telmateia* (Ehrh.) under that name, for he says (Mant. ii. 504) of *E. fluviatile*, "caules floriferi a sterilibus distincti, ut *E. arvensis*, Hall." We ought not to wonder that Sir J. E. Smith was misled by the adoption by Linnæus of Haller's observation as applicable to his species, when we consider how little the Linnæan specific character affords upon which to found an opinion, and that the specimens in his herbarium might well have been misnamed. We now find that the specimens named *E. fluviatile*

in the old Swedish herbaria are all the *limosum* of Smith, and this corresponding with the Linnæan herbarium and not disagreeing with his specific characters, but only with a note in the second Mantissa, a work of but little authority, appears to afford conclusive reasons for reverting to the Linnæan name which has always been thus employed by those authors who looked to Sweden for evidence and not to Smith's 'Flora Britannica.' Before proceeding we may state that Fries distinguishes the two Linnæan plants, saying of *E. limosum*, "ramulis vagis lævibus vaginis viridi-dentatis," and of *E. fluviatile*, "vaginis ramul. atris" (Fl. Scan. 155); he considers both of them as more or less constantly branching, nor can we agree with Newman's observation (at page 7) that the *limosum* (Linn.) never branches. At that page he separates the unbranched form of the British *E. limosum* from *E. fluviatile*, but does not characterize it, only stating, we think incorrectly, that it "never, under any circumstances, becomes branched." Should the plants be really different, a character may perhaps be found in the presence of a furrow (division of the rib according to Newman) on the back of the teeth of the sheaths of *E. fluviatile*, and its absence from those of *E. limosum*.

The change of name which we have just noticed obliges us to adopt another for the *E. fluviatile* of Smith, and as Ehrhart's *E. Telmateia* is undoubtedly the oldest, it is of course the one to be employed. The name also of *E. umbrosum* must necessarily be adopted in place of *E. Drummondii*, it having the claim of antiquity in its favour.

Lomaria Spicant (Desv.).—This is the *Blechnum boreale* of our authors, and appears to us not to agree well with either of those genera, but we think with Sir W. J. Hooker that it is more nearly allied to *Blechnum* than to *Lomaria*.

Woodsia ilvensis and *W. alpina* (Newm.) we must confess ourselves to be unable to distinguish from each other, although the fronds figured by Mr. Newman are very different. If they should prove distinct, it would appear that he is correct in changing the name of *hyperborea* for that of *alpina*, Bolton having been its earliest describer.

Cystopteris montana is a most interesting addition to our native ferns. It was found by Mr. W. Wilson on Ben Lawers.

We quite concur in the adoption of Roth's genus *Polysticum* for the *Aspidium Lonchitis* and its allies. After a careful study of the plants denominated *A. aculeatum*, *lobatum* and *angulare*, a considerable change has been brought about in our views, which now accord with those of Mr. Newman and many continental botanists who think that the former two are one species, from which the *angulare* is distinct. The oblique base of the decurrent pinnules in the former contrasts well with the truncate base of the distinctly stalked pinnules of the latter. Still we must confess that lingering doubts remain, since we occasionally find in some specimens of *aculeatum* pinnules approaching very nearly in form and mode of attachment to those of *angulare*.

Lastræa.—Some of the species included in this genus, in the al-

teration of the name of which from *Aspidium* we fully concur, present considerable difficulty, and it will be found that Mr. Newman has totally altered his views concerning them, distinguishing three species (*spinosa*, *multiflora* and *recurva*) where he only allowed one (*dilatata*) in his former work. He deserves very great credit for acuteness in detecting characters by which these three plants are distinguishable, and which, as far as our limited observation extends, appear to be permanent. We refer to the form of the scales clothing the lower part of the stem, by attending to which, as figured at page 214 of Mr. Newman's work, it appears almost certain that perfect individuals of the plants may always be distinguished. The subject of their nomenclature presents far greater difficulty. *L. spinosa* (Newm.) is considered by our author as different from *Asp. spinulosum* (Swartz), and it is singular and unfortunate that authentic specimens from that author, both of this and also of *A. dilatatum*, should be wanting in England. We possess two specimens of a fern from different parts of Germany and from different botanists, and also an imperfect one from the Vosges mountains in France, named *A. spinulosum* (Sw.), which are certainly the *L. spinosa* (Newm.), but, as most authors state that the true plant of Swartz has stalked glands upon the edge of its indusium, it is probable that they are wrongly named, and that Roth's *Polys. spinosum* is the oldest certain name for this species. The same difficulty attends the *L. multiflora* (Newm.), which appears certainly to be the plant of Roth, but scarcely determinable in other respects. We possess it under the name of *Asp. dilatatum* (Sw.) in Durieu's Asturian Collection (no. 153), but have not seen German specimens, and the absence of the requisite materials prevents us from forming an opinion concerning its identity with the *Polys. dilatatum* (Hoffm.), or the relative claims of Hoffmann and Roth as its first describers. The third plant to which we have referred, the *L. recurva* (Newm.), is, we now think, a good species. We possess Scottish specimens from Tobermory in the Isle of Mull, thus proving it to exist in that country as well as in England and Ireland, but did not observe it during a recent tour in the south-west of Scotland. Agreeing with our author in considering it as a species, we have to complain greatly of its name. A worse could not have been selected, as it conveys a totally wrong idea of the character of the frond, the whole and every part of which is more or less *incurved* (the edges turning upwards), never *recurved* or turned downwards; Mr. Babington's manuscript name of *concavum* (under which denomination many specimens have been distributed by him) conveys a far better idea of the plant. There is great reason to hope that the name of *dumetorum* may be retained for this plant, although the specimens preserved in Smith's herbarium under that denomination do not agree with it. It is nevertheless the opinion, we believe, of our older botanists, who were well acquainted with Smith's plants, that the present species was included by him under his *A. dumetorum*; should not this be the case, we have Mr. Newman's own admission that it is the *A. dumetorum* of Mackay, and as Smith's name would drop, that becomes the

oldest *specific* name, and ought perhaps to be employed under any circumstances; but we would certainly admit very little proof as sufficient for the dismissal of so incorrect a name as *recurva*.

Athyrium filix-fœmina.—The account of this plant is well deserving of careful study, as we suspect that the plant named *A. rhœticum* by Roth will be found to be a distinct species.

It appears to be highly probable that *Trichomanes speciosum* is identical with *T. radicans*, as stated by Sir W. J. Hooker in his 'Species Filicum'; indeed his series of specimens is so perfect, that it is hardly possible to come to any other conclusion. That our plant is the *T. speciosum* (Willd.) is certain, and we also feel quite convinced that the supposed new species named *T. Andrewsii* by Newman is only one of its forms.

We have been considerably amused by observing the credit which our author takes to himself for his figures of our two *Hymenophylla*, that of *H. Wilsoni* appearing to us to be by far the most unsatisfactory figure contained in his book.

Having now occupied so much space, we cannot enter upon the consideration of the many valuable observations contained in other parts of the work before us, but protest against an endeavour made in the Synopsis, the last written part although the commencement of the book, to change two known and recognised generic names solely because they were originally employed specifically for the plants upon which the genera are founded; *Scolopendrium* Mr. Newman would change into *Phyllitis*, and *Ceterach* into *Notolepeum*. He would also separate *Asplenium septentrionale, germanicum* and *ruta-muraria* from that genus, and give them the name of *Amesium*. We doubt if the want of a distinct mid vein to the ultimate divisions is a sufficient reason for the formation of a new genus.

In conclusion we again compliment Mr. Newman upon the excellent book which he has produced, one which must find its way into the hands of all botanists, who cannot fail to be struck with the great powers of discrimination, accuracy of description, and critical acumen of its author. In beauty of illustration also it is a worthy companion to the elegant and valuable series of works on British Natural History which have been published by Mr. Van Voorst.

Faune Ornithologique de la Sicile. Par Alfred Malherbe. 8vo. Metz, 1843. Pp. 242.

This valuable contribution to the zoology of Southern Europe is an extract, published as a separate volume, from the 'Mémoires de l'Académie Royale de Metz.' After a brief *résumé* of the numerous subjects of interest which Sicily presents to the historian, the antiquarian, the geologist, the botanist and the zoologist, the author proceeds to the especial object of his treatise. He enumerates no less than 318 species of Sicilian birds, a number which might surprise us, did we not consider that Sicily, from its intermediate position between Europe and Africa, is resorted to by many species of birds

during the vernal and autumnal migrations, besides those which breed or which hybernate in the island. The author judiciously omits the specific descriptions, which may be found in the works of Temminck, Gould, and other writers on European ornithology, and which would have greatly increased the bulk of his volume. He confines himself therefore to reciting the scientific and vernacular Sicilian synonyms of the species, and adds a multitude of original observations on the migrations, habits and geographical distribution of the several species. In the latter department he was assisted by M. Ledoux, who communicated many details on the birds of Algeria, of which we previously knew but little, and which acquire additional interest when compared with those of Sicily.

Among the many valuable observations in this volume, we may select a few by way of examples. The *Saxicola aurita*, which the Prince of Canino in his 'Fauna Italica' considers to be a peculiar state of plumage of *Saxicola stapazina*, is nevertheless regarded by M. Malherbe as a distinct species. He states that the two species arrive in Sicily together, and leave it at the same period of the year, a fact which would certainly indicate that the difference of plumage in these two birds is not due to change of season. He confirms the statement of Temminck that the blue-throated redstart with a *white* pectoral spot is confined to the southern and central parts of Europe, while the bird with a *rufous* spot on the breast forms a "constant race" (in other words a *species*) peculiar to Northern Europe, and only straying by accident into Germany, France and Britain. M. Malherbe agrees with the Prince of Canino in regarding the three yellow wagtails of Southern Europe (*Budytes flava, cinereocapilla* and *melanocephala*) as distinct species from each other, and from the *Budytes Rayi* (more properly called by Pallas's name *campestris*) of Britain, France and the Pyrenees. The three former species arrive in Sicily at different periods of the spring, and proceed to various parts of Europe, the *B. flava* extending its migrations to the greatest distance north.

The author sets at rest the statement made by M. Cantraine to M. Temminck, as to the supposed existence of *wild turkeys* in Sicily; the former admitting that he had been deceived so far as Sicily was concerned, but repeating that he had been assured on good authority of the existence of these birds in a wild state on the coast of Dalmatia. M. Malherbe supposes that they may have escaped from some vessel to the shore; but it appears to us far more probable that the whole statement has reference, not to turkeys, but to the great bustard, *Otis tarda*, which is commonly known by the name of "*Dindon sauvage*" among the Franks of the Levant.

The beautiful *Porphyrio antiquorum* of Southern Europe, which is still so rare in our collections, is stated to be abundant in Algeria. In some parts of Sicily it is also very frequent, and is a permanent resident. Its habits seem to be precisely those of the common moorhen (*Gallinula chloropus*), and our author states that these birds are frequently kept alive in the poultry-yards of Sicily, so that they might

easily be introduced into our Zoological Gardens. Another interesting and little-known bird is the *Fulica cristata*, which is abundant at Algiers, and occurs occasionally in Sicily, Sardinia and Provence.

We may here notice a new species of *Picus* described by M. Malherbe in the 'Mémoires de l'Académie de Metz,' 1843, and of which he proposes to give a coloured figure in the general history of the *Picidæ*, which he informs us he is now engaged upon. This species, which he names *Picus numidus*, takes the place of *Picus major* in Northern Africa, and is common in the forests of Bona. The size is less than that of *P. major*, but the beak is generally longer. The plumage much resembles that of the latter species, but the white patch on the side of the neck and the white spots on the wings are smaller, and the black stripe on each side of the throat meets in front on the breast, where it is succeeded by a band of crimson.

We shall wait with interest for further contributions to zoology from M. Malherbe, who has already done much to advance science by the above publications.

Über die Verwandlung der Infusorien in niedere Algenformen. Von Dr. F. T. Kützing. Nordhausen, 4to, 1844.

It has long been a favourite notion with German botanists, that under varying momenta of air, heat, moisture, &c., the same germ is capable of producing widely different objects. This has been worked out with more or less ability by a host of writers, and though in many cases it has been attempted to support it by the very loosest observations and reasonings, this reproach cannot justly be given to all its supporters, for there are many, not only from their literary reputation but from the merit of the observations themselves, however differently we may be inclined to interpret them, who at least require respectful attention. There is no doubt that the conclusions are implicitly believed by themselves to be just and logical, with a deep persuasion that they are by no means inconsistent with fit and humble views as to the nature of the great Creator of the Universe, and it is clear that they have the greatest difficulty in imagining how they can possibly make a different impression upon others. To such an extent has this notion been carried, that we are informed in the number of 'Botanische Zeitung' for 19th July 1844, that Reissek of Vienna has succeeded in making pollen grains germinate in the parenchym of leaves and stems, not merely of the mother-plant, but also on those of others belonging to different natural orders; that they produced fungi laden with spores, and that these spores when placed in water produced confervoid plants filled with chlorophylle, and copulating with one another; that he observed also the metamorphosis of the pollen cells into animals of Ehrenberg's genus *Astasia*, and that the contents of the pollen cells also produced plants and animals. From the smaller particles were originated *Bacteriæ*, Vibrios and Confervas; from the larger, green globular Monads.

He professes also to have observed the metamorphosis of the chlorophylle of phænogamous plants into Confervæ and Infusoria. From

grains of the same species were derived, according to the varying momenta, *Monas Termo*, *M. vivipara*, *Astasiæ*, or *Colpoda Cucullus*, &c.

Kützing's observations indeed do not profess to go quite so far as this, but they are scarcely less extraordinary. His views are detailed at very great length, with numerous illustrations, in his prize essay, entitled 'Die Umwandlung niederer Algen-Formen in höhere so wie auch in Gattungen ganz verschiedener Familien und Klassen höherer Cryptogamen mit zelligem Bau,' published at Haarlem in 1841. The object of this was to show, as the title expresses, that the lower forms of Algæ are capable of being changed into more highly organized species, or even into species belonging to different families and classes of the higher cellular plants. And in the present treatise he extends his observations to Infusoria, believing that he has observed their transmutation into Algæ. In both cases the subject has been worked out with such pains, and so many valuable observations are intermixed with his peculiar views, that the treatises are worth reading, not merely with a view of ascertaining the exact notions entertained upon such subjects, but for the sake of the pearls which may be picked up by the way.

The observations do not admit of abridgement, one depending so much upon another, that it is almost impossible to form any fair judgement without examining the whole; nor would they be well understood without the aid of the figures, which are executed with the usual skill of the author.

We shall therefore content ourselves with referring those who are desirous of the latest information on the subject to the memoirs themselves, after making two or three remarks on the matter generally. As far then as we understand what we have read on the subject, we cannot help first remarking that the observations cannot be considered conclusive, apart from all prejudice either way, till a certain number of bodies ascertained to be precisely of the same nature be isolated, and the changes of these observed with every possible precaution to avoid error. At present it seems to us that there is not by any means sufficient proof that the objects in question really arise from germs of the same nature.

The second remark we would make is, that there appears too often in treatises of this description to be great indistinctness as to the notion of what a species really is. We know that in the course of development higher bodies go through a vast variety of phases which resemble very closely true substantial species which have arrived at their full development; but we are not therefore to suppose, that in passing through their phases the production has really consisted of such a number of real species. In the Agardhian sense this may be true enough, for when he pronounces the vessels and cells of phænogamous plants to be Algæ, his meaning appears to be, however strongly he expresses himself, merely that they are representatives of Algæ, and resemble them in structure.

We would remark also, that the real difficulty of the case does not depend on the question as to the difference of animal and vegetable life. These evidently in certain parts of the creation are so intimately

combined, that it is quite impossible to say where the one ceases and the other begins, and there is really no reason why we should be incredulous as to the possibility of the same object being at one time endowed more especially with animal and at another with vegetable life. Late observations on the reproductive bodies of some Algæ show that their motion is produced by vibratile cilia exactly in the same way as in certain animals. But it is exceedingly difficult to imagine the transformation of one real species into another. The same species may assume a vast variety of forms according to varying circumstances, and it is highly instructive to observe these changes; but that the same spore should under different circumstances be capable of producing beings of an almost entirely different nature, each capable of reproducing its species, is a matter which ought not to be admitted generally without the strictest proof. Observations made with care on isolated individuals, and not on a common mass, which can scarcely be otherwise than more or less heterogeneous, could not fail to be instructive, and might lead to results, which, if they did not confirm the views so commonly entertained in Germany, would have an influence on science which it is difficult at present to appreciate.

Annales des Sciences Naturelles.

June 1844.—*Zoology.*—Conclusion of M. Duvernoy's memoir on the *Pœcilia surinamensis* (with a plate).—Mr. Darwin on *Sagitta* (translated from the 'Annals of Nat. Hist.' no. 81).—M. Leon Dufour on the metamorphoses and anatomy of *Piophila petasionis* (with a plate).—A notice of the life of M. Geoffroy St. Hilaire.

Botany.—Boissier, Plantæ Aucherianæ, sp. 140 to 187 (all *Umbelliferæ*).—Miquel on *Beyeria*, a new genus of *Euphorbiaceæ*. Char. (*Flores* dioici apetali. *Calyx* 5-partitus. *Antheræ* extrorsæ. *Ovarii* loculi uniovulati. *Stigma* pileiforme integerrimum sessile.) Sp. typ. *Beyeria viscosa* (figured) from Rottenest Island, on the S.W. coast of New Holland.—M. Theod. Hartig, Contributions to the history of the development of plants (a translation from the German), in part an abstract.—Note on the organization and mode of fructification of *Onygena*, by MM. L.-R. and C. Tulasne (with a plate; all the drawings of these botanists are highly instructive and very beautiful).—H. Mohl on the growth in thickness of Dicotyledonous trees (a translation from the German).—Lemaire on *Delairea*, a new genus of *Synantheræ*. Sp. typ. *Delairea odorata*, probably from Mexico?

July 1844.—*Zoology.*—An elaborate memoir by M. Joly on the habits, metamorphosis, anatomy and embryogeny of the *Colaspis atra*, a little coleopterous insect which infests the lucern in the south of France: with plates.—M. Letellier on the action of sugar in the alimentation of Granivoræ (from the 'Annales de Chimie').—A translation from the German of M. C. Vogt's observations on the embryology of Batrachiens.—M. Gervais on the Myriapoda.

Botany.—Unger on the *Achlya prolifera* (translated from the 'Linnæa').—M. Ad. Brongniart on the structure of the pistil and the origin of ovules (see 'Annals,' no. 87).—Fourth series of notes (in

reply to M. Mirbel) on the anatomy and physiology of Monocotyledons, by M. Gaudichaud.—Boissier, Plantæ Aucherianæ, sp. 188 to 240 (*Umbelliferæ*).

August 1844.—*Zoology*.—Continuation of M. Gervais's memoir on the Myriapoda. In this part a new genus, *Scolopendrella*, is constituted for the reception of a little myriapod allied to *Geophilus*, from the neighbourhood of Paris.—M. Quatrefages on the nervous system of Annelides: an elaborate paper with two fine plates.—M. Bischoff on the ovum of man and the mammalia.

Botany.—Boissier, Plantæ Aucherianæ, sp. 241 to 301 (*Umbelliferæ*).—M. Dutrochet's report on the memoir of M. Payer on the tendency of roots to avoid the light.—M. Raoul on new plants from New Zealand. Three new genera are described in this paper, *Ileodictyon*, a fungus; *Pukateria*, allied to *Cornus*; and *Tetrapathea*, allied to *Passiflora*, but dicœcious.—M. Gaudichaud on Monocotyledons, continued.

PROCEEDINGS OF LEARNED SOCIETIES.

ZOOLOGICAL SOCIETY.

February 27, 1844.—Professor Owen in the Chair.

"Description of new species of Shells, by Mr. Hinds."

Six species of *Triton*, from the collection of Sir Edward Belcher, C.B.

TRITON, Montfort.

1. TRITON VESTITUS. *Tr. testâ ovatâ solidâ, fuscâ; anfractibus rotundatis, transversim striatis, lineis longitudinalibus decussantibus præcipuè spiræ nodulosis, ultimo albo fasciato; aperturâ elongatè ovali; labro incrassato, intùs dentibus geminis albis, undique purpurascentibus; columellâ purpurascente vel nigrâ, plicis albis varicosâ; fauce albâ; epidermide valdè lamellosâ, pilis nigris numerosis indutâ.* Axis 27 lin.

Hab. Realejo, gulf of Nicoya, and bay of Honda, west coast of America.

2. TRITON BRACTEATUS. *Tr. testâ ovatâ, elongatâ, longitrorsum costatâ, transversim striatâ, maculis parvis nigris seriatim dispositis ornatâ; spirâ aperturam superante; aperturâ parvâ, albâ, denticulatâ; canali brevisculo.* Axis 8 lin.

Hab. Marquesas; New Ireland; Straits of Malacca: on the shores and in seventeen fathoms, mud.

3. TRITON TRUNCATUS. *Tr. testâ solidâ, fulvâ, fusco nebulosâ, truncatâ, longitrorsum costatâ, striis decussantibus; costis rotundatis, confertis, anfractu ultimo pallidè fasciato; aperturâ albâ, denticulatâ; canali brevisculo.* Axis 6 lin.

Hab. New Ireland; among the coarse sand of the shore.

4. TRITON ANTIQUATUS. *Tr. testâ elongatâ, turritâ, subcylindraceâ, lineis decussantibus textili, costis propè suturam evanidis; spirâ aperturam duplò vel triplò superante; apice eroso; aperturâ parvâ,*

subquadratâ, pallidâ; labio interno anticè valdè producto. Axis 10 lin.

Hab. New Ireland; with the preceding.

5. Triton fictilis. *Tr. testâ ovatâ, solidulâ, cinereâ; anfractibus senis rotundatis, longitrorsum obliquè plico-costatis, transversim tenuiter striatis; spirâ aperturam vix superante; aperturâ callosâ, contractatâ, politâ, intùs lævigatâ.* Axis 7 lin.

Hab. Lagulhas Bank, Cape of Good Hope; in between fifty and sixty fathoms.

6. Triton anomalus. *Tr. testâ ovatâ, fuscâ, longitrorsum costatâ, lineis transversis elevatis cancellatâ; spirâ aperturam æquante; suturâ validâ; evaricosâ; aperturâ ovali, pallidâ; canali brevius-culo.* Axis 7 lin.

Hab. Island of Quibo, Veragua; on the sandy shore at low water.

Solarium, Lamarck.

At the sale of the collection of shells of Mr. Imwood, several lots of *Solarium* came into my possession; and as it was a favourite group with this gentleman, he, as might naturally be supposed, had assembled together many very interesting specimens. The full suites of some of the species have enabled me better to draw a line of distinction between them, and has afforded grounds for regarding several of the following as perfectly distinct and hitherto undescribed species. In addition to the above, I have had before me the collections of Sir Edward Belcher and Mr. Cuming, both rich in novelty, but more particularly in the careful and accurate detail of localities and circumstances of habitation. The whole permits me to record fourteen new species in a genus which previously seemed to contain about fifteen recent and forty-nine fossil species.

1. Solarium formosum. *Sol. testâ orbiculato-conicâ, politâ, fasciatâ; anfractibus subtumidis, supernè sulco unico divisis, inferioribus lævigatis, spiræ plico-striatis, supernè fusco, albo, et atro-fusco deinceps fasciatis, mediò subcorneis; ad basin planulatâ, aperturâ quadratâ; umbilico patulo, crenis rectis, subacutis, fuscatis; aream umbilicali latâ, sublævigatâ.* Diam. 18, umbilic. 3½ lin. Chemnitz, vol. v. t. 172. f. 1693.

Hab. Amboina. Cab. Hinds.

This fine shell has hitherto, most probably, been considered only as a variety of the well-known species *S. perspectivum*; it is however sufficiently distinct. In shape it is considerably more elevated and conical, and it is ornamented with rich fasciations of brown and white. Near the upper part of each whorl a narrow sulcus separates a narrow portion. The base is flattened and polished; umbilicus moderately dilated, being less so than in *S. perspectivum*, and armed on the margin with a row of straight sharp crenules, on their right faces of a darker brown colour. The umbilical area, or the space between the spirally twisted row of crenules, is smooth, except for the arched striæ of growth.

2. Solarium placentale. *Sol. testâ discoideâ, pallidè fulvâ, læ-*

vigatâ; spirâ valdè depressâ; anfractibus planulatis, ordinatè spiraliter striatis; ad peripheriam obtusè unicarinatâ, subtùs striatâ; carinâ crenulatâ; ad basin subtumidâ; aperturâ triangulari; umbilico valdè patulo, crenis tuberculatis subdistantibus armato.

Hab. Bay of Magdalena, California; in seven fathoms, sand.

Cab. Belcher.

3. Solarium perdix. *Sol. testâ conoideâ, tenui, lævigatâ, pallidâ; anfractibus subtumidis, supernè cingulo unico divisis, spiræ minutè plico-striatis; ad peripheriam angulatâ tricarinatâ, carinâ mediâ prominente, majore, creniferâ; cingulo et carinis maculis rufis subquadratis ornatis; umbilico patulo, crenulis parvis albis cincto.* Alt. 6, diam. 14 lin.

Hab. Ceylon; north-west coast of Australia.

Cab. Cuming and Hinds.

Possesses the general contour of *S. perspectivum*, but is thinner; the whorls are slightly tumid, and furnished above with a flat smooth girdle, ornamented with somewhat distant rufous spots. The most prominent keel is characteristically covered with small tubercular crenulations. When placed on its base the apex is much inclined, and the general direction oblique. The umbilicus is somewhat less patulous than in *S. perspectivum*, and neatly encircled with numerous white and smaller crenations. The umbilical space is destitute of ribs, folds, or keels, bearing alone the marks of the striæ of growth and a thin horny epidermis.

4. Solarium quadriceps. *Sol. testâ orbiculato-discoideâ; anfractibus quadriseriatim cingulatis; cingulis tuberculis quadratis, planulatis, approximatis instructis, inferiore majore, et cum superiore rufo picto; ad basin tumidâ, aream mediam radiatim plicatâ; umbilico patulo, crenis magnis fuscis cincto; aream umbilicali lævi.* Alt. 5, diam. 11 lin.

Hab. Bay of Panama; in five fathoms, among mud.

Cab. Belcher.

Very closely allied to *S. granulatum*, from which it will be found to differ in the character and relative proportion of the granular girdles. A single and perhaps rather small specimen was alone obtained, which is somewhat more discoid than the above species; four girdles traverse each whorl, of which the inferior is the largest, and the tubercles closely set, flattened, and obliquely square; the umbilicus is rather more expanded, and the marginal tubercles are of a similar size, but coloured of a reddish brown. *S. quadriceps* is an American shell, and *S. granulatum* an Asiatic.

5. Solarium asperum. *Sol. testâ discoideâ; spirâ retusâ; anfractibus supernè planulatis, infernè rotundatis, ubique cingulis parvis numerosis instructis; cingulis tuberculis parvis asperatis; umbilico valdè patulo; aream angustâ, lævi.* Alt. $1\frac{1}{2}$, diam. $4\frac{1}{2}$ lin.

Hab. Straits of Macassar; in eleven fathoms, coarse sand.

Cab. Belcher.

A single dead specimen only was obtained, destitute of colour and choked with sand. It is remarkable from its rounded base and its

very expanded umbilicus, which is proportionately larger than in any other species. In *S. perspectivum* the umbilicus is equal to a third of the diameter, but in the present species it is two-fifths.

6. Solarium dorsuosum. *Sol. testâ conoideâ, lævigatâ, solidâ, fuscâ, albo confusè nebulosâ; anfractibus planulatis, spiraliter seriatim sulcatis, spiræ leviter striatis; ad peripheriam sulcis geminis instructâ; basi sulcatâ, versùs centrum subtuberculatâ; umbilico patulo, crenis magnis cincto; aream umbilicali unicostatâ; aperturâ subrotundatâ, internè bisulcatâ.* Alt. 4, diam. 6½ lin.

Hab. Puerto Galero, island of Mindoro, Philippines; in seven fathoms, sandy mud.

Cab. Cuming.

7. Solarium dealbatum. *Sol. testâ conico-trochiformi, albâ; anfractibus planulatis, quadriseriatim granulato-costatis; cingulo ultimo paulò majore, prominulo; umbilico coarctato, crenis parvis instructo; areâ umbilicali multicostatâ; aperturâ rotundatâ.* Alt. 7, diam. 6 lin.

Hab. Manila. Cab. Hinds.

This species may be readily distinguished from *S. variegatum* by its uniform colour and by the several ribs which cross the umbilical space, all of which are of equal size; from *S. cylindraceum* by its decided conical shape, and the characters detailed above observable in the inferior girdle.

It is unquestionable that a sound division of the genus may be effected, by taking *S. variegatum* as the type of a new group; and this opinion rests on the conformation of the foot of the animal, decidedly sessile eyes, and very peculiar operculum of this species. But in trying to effect this I have met with the following genera, all of which have been advanced for sections of the genus as left by Lamarck:—*Omalaxis*, Deshayes; *Bifrontia*, Deshayes; *Helicites*, Schlotheim; *Cirrus*, Sowerby; *Euomphalus*, Sowerby; *Schizostoma*, Bronn; *Solariella*, Searles Wood; *Torinia*, Gray; and not having before me the materials for deciding their respective merits, and being averse to treating the difficulty as a gordian knot by the erection of another genus, I am compelled to leave the subject as I found it.

8. Solarium fragile. *Sol. testâ orbiculato-discoideâ; anfractibus quadriseriatim tuberculato-cingulatis; cingulo supremo et ultimo fusco pictis, medianis margaritaceis; ad peripheriam angulatâ, crenulatâ; basi tumido; umbilico patulo, crenis parvis albis acutis cincto; areâ umbilicali lævi; aperturâ triangulari.* Alt. 1, diam. 3 lin.

Hab. North coast of New Guinea; in seven fathoms, sand.

Cab. Belcher.

9. Solarium fulvum. *Sol. testâ orbiculato-discoideâ, solidulâ, fulvâ; spirâ retusâ, anfractibus multiseriatim granuloso-cingulatis, medianis minoribus; ad peripheriam obtusâ, carinis duabus, tertiâ minore intermediâ; basi rotundatâ, seriatim granulatâ; umbilico mediocri, crenis concoloribus cincto; areâ umbilicali leviter unicostatâ; aperturâ subquadratâ.* Alt. 1½, diam. 3½ lin.

Hab. New Guinea. Cab. Belcher and Hinds.

10. Solarium virgatum. *Sol. testâ orbiculato-discoideâ, spirâ retusâ; anfractibus quadriseriatim granulatis, cingulo supremo et ultimo rufis, medianis albis; ad peripheriam obtusis, duabus carinis crenulatis; basi rotundatâ, seriatim granulatâ; umbilico mediocri, crenis albis cincto, extùs cingulo rufo tuberculato; aperturâ angulatâ.* Alt. 1, diam. 2 lin.

Hab. New Guinea. Cab. Belcher.

11. Solarium fenestratum. *Sol. testâ orbiculato-discoideâ, spirâ retusâ; anfractibus multiseriatim granulatis, longitrorsum striatis; suturâ canaliculatâ; ad peripheriam rotundatâ, carinis tribus subæqualibus; basi rotundatâ, seriatim granulatâ; umbilico subpatulo, crenis parvis numerosis cincto; areâ umbilicali carinis duabus parvis; aperturâ rotundatâ.* Alt. $1\frac{2}{3}$, diam. $3\frac{1}{2}$ lin.

Hab. New Guinea. Cab. Belcher.

As the only specimen obtained was without the animal, deprived of colour, and had evidently been some time lying in the mud, the cancellation is perhaps considerably more distinct than in the recent state. It is one of those which approach very closely to the unarmed species of *Delphinula*.

12. Solarium cælatum. *Sol. testâ parvâ, valdè discoideâ, nitidâ, fuscâ; spirâ nullâ; anfractibus propè suturam uniseriatim tuberculatis, mediò eleganter radiatim plico-striatis; ad peripheriam carinis duabus obtusis tuberculatis; ad basin rotundatâ; aperturâ subrotundâ; umbilico valdè patulo, crenis parvis numerosis armato.* Diam. 2, umbilic. 1 lin.

Hab. Straits of Macassar; in ten fathoms, among coarse sand. Cab. Belcher.

13. Solarium trochleare. *Sol. testâ orbiculato-conoideâ, depressiusculâ; anfractibus subtumidis, spiræ longitudinaliter plicatis, ultimo lævigato, supernè sulco unico divisis, aream supremâ atro-fusco fasciatâ, infrà maculis quadratis atro-fuscis cinctâ; ad peripheriam carinatâ, maculis albis et atro-fuscis articulatè ornatâ; ad basin paulisper tumidâ; umbilico magno, patulo; crenis subacutis fuscis.* Diam. 29, umbilic. 8 lin.

Hab. Indian Seas. Cab. Cuming and Hinds.

In general appearance it very closely resembles *S. perspectivum*, with which it has no doubt been long associated. In comparing the adult shells of both species, this will be found somewhat smaller, thinner, and more depressed; the whorls are somewhat more tumid, those of the spire obliquely longitudinally folded, but the last and penultimate are smooth, or very nearly so; above they are divided by a single groove, between which and the suture is a continuous dark band, beneath a series of square approximating spots, which towards the spire usually become continuous; the base is also somewhat tumid; the umbilicus is large, expanded, and perspective, and surrounded by chestnut-brown angular crenations; and the aperture is rhomboidal. It is no doubt an Indian species, but the locality is not known.

14. Solarium purpuratum. *Sol. testâ conico-orbiculatâ; anfractibus subtumidis, spiræ longitudinaliter obliquè plicatis, supernè*

sulcis duabus cinctis, maculis rufo-fuscis subgeminis ornatis, aream mediam pallidè cinereâ; ad peripheriam carinatâ articulatè maculatâ; ad basin strigis rufo-fuscis radiatim dispositis; umbilico subpatulo, crenis parvis albidis. Diam. 15, umbilic. 4 lin.

Hab. ——? Cab. Hinds.

The base is distinctively ornamented with reddish-brown rays, and the square spots on the whorls are somewhat twin in their distribution, since they occupy corresponding situations in the two upper narrow areas.

CORBULA, Bruguières.

1. CORBULA CRISPA. *Corb. testâ ovatâ, solidâ, albidâ, anticè rotundatâ, posticè truncatâ, ab umbonibus obtusè carinatâ; valvis rotundatis, dextrâ eburneâ sulcatâ, sinistrâ ferè lævigatâ; umbonibus politis, eburneis.* Long. $4\frac{2}{3}$; lat. $2\frac{1}{2}$; alt. 3 lin.

Hab. Island of Burias, Philippines. Cab. Cuming.

2. CORBULA ADUSTA. *Corb. testâ subobliquè trigonâ, lævigatâ, fuscâ, subtumidâ, anticè rotundatâ, posticè subacuminatâ, ab umbonibus angulatâ; valvarum marginibus ventralibus acutis, productis; umbonibus erosis.* Long. 6; lat. $2\frac{2}{3}$; alt. 5 lin.

Hab. New Zealand. Cab. Cuming.

3. CORBULA PROCERA. *Corb. testâ ovatâ, lævigatâ, fuscâ, anticè rotundatâ, posticè elongatâ, subnasutâ; valvarum marginibus ventralibus acutis, productis; umbonibus erosis.* Long. 7; lat. 3; alt. 5 lin.

Hab. ——? Cab. Cuming.

These two species closely resemble each other, and both are probably estuary shells.

4. CORBULA CARNOSA. *Corb. testâ ovatâ, solidâ, subæquilaterali, pallidâ, carnoso-roseo radiatâ; valvis ambabus sulcatis, marginibus ventralibus inclausis; anticè rotundatâ, posticè subnasutè breviter attenuatâ; umbonibus lævigatis, ad angulos albidis.* Long. $4\frac{1}{2}$; lat. 2; alt. 3 lin.

Hab. ——? Cab. Cuming.

"Continuation of Mr. G. B. Sowerby's description of *Scalaria*."

SCALARIA AURITA, Thes. Conch. part 4. pl. 33. f. 62. *Scal. testâ elongatâ, lævi, umbilicatâ; anfractibus rotundatis, contiguis; varicibus lævibus, decumbentibus, subnumerosis, propè suturam subarcuatis, nonnullis crassis, pluribus tenuibus; aperturâ magnâ, auriformi; colore inter varices fulvo, fasciis tribus fuscis.*

In general form resembling *Sc. lineata* of Say, but wanting the keel on the lower whorl, and having a large open umbilicus. In Mr. Cuming's collection; from the coast of Coromandel.

SCALARIA IMMACULATA, Thes. Conch. part 4. pl. 33. f. 58. *Scal. testâ pyramidali, acuminatâ, transversè minutissimè striatâ; anfractibus numerosis, rotundatis, suturâ distinctâ; varicibus simplicibus, plerumque tenuissimis, nonnullis crassiusculis; aperturâ ovali, posticè acuminatâ, labio interno anticè subincrassato; umbilico mediocri; colore albo.*

Very much like *Sc. vestalis* of Hinds, lately described in the 'Zoological Proceedings,' but more elongated, with a larger umbilicus and with the varices near the suture simple, whereas in *Sc. vestalis* they are acuminated.

Collected by Mr. Cuming in sandy mud at eight or ten fathoms, at Catanauan, province of Tayabas, isle of Luzon.

Scalaria Catanauensis, Thes. Conch. part 4. pl. 34. f. 93 & 94. *Scal. testâ pyramidali, acuminatâ, minutissimè striatâ; anfractibus rotundatis, rapidè crescentibus, varicibus plerumque obsoletis, nonnullis rariùs crassis; aperturâ ovali, subauriformi; umbilico parvo; colore validè griseo, in medio anfractuum fasciâ fuscâ, latâ, obscurâ.*

It is much shorter than *Sc. Martinii*, with the thickened costæ still more rare; the aperture is less oval and less auriform. There is a broad band of pale brown in the centre of the whorls.

Brought from Catanauan, isle of Luzon, Philippines, by Mr. Cuming, and found in sandy mud at a depth of eight or ten fathoms.

Scalaria similis, Thes. Conch. part 4. pl. 34. f. 90. *Scal. testâ subovali, spiraliter minutissimè striatâ; anfractibus paucis, varicibus tenuissimis, plerumque numerosis, nonnullis crassiusculis; aperturâ ovali, posticè subangulatâ, labio interno vix incrassato et expanso; umbilico parvo; colore pallidissimè fulvo.*

The whorls are much less prominent, the minute varices more numerous, and the umbilicus considerably smaller than in *Sc. Catanauensis*.

Collected by Mr. Cuming in Puerto Galero, isle of Mindoro, in sandy mud at four or five fathoms.

Scalaria bullata, Thes. Conch. part 4. pl. 34. f. 87. *Scal. testâ ventricosissimâ, brevi, lævi, anfractibus paucis, rapidè crescentibus, varicibus subnumerosis, irregularibus, decumbentibus, plerumque tenuissimis, nonnullis crassioribus, ad suturam paululùm elevatis et reflexis; aperturâ magnâ; umbilico parvo; colore albo.*

We have only one specimen of this extremely ventricose shell, in a very imperfect state, from the island of Capul, Philippines, taken on the coral reefs by Mr. Cuming.

Scalaria friabilis, Thes. Conch. part 4. pl. 33. f. 74. *Scal. testâ pyramidali, acuminatâ, tenui, imperforatâ; varicibus tenuissimis, valdè numerosis, laminatis, extantibus, propè suturam acutè angulatis; aperturâ magnâ, labio interno subincrassato; colore albo.*

A thin pyramidal species, with extremely numerous thin laminar varices, which project in an acute angle close to the suture.

In Mr. Cuming's collection; brought from Swan River by Lieut. Collie, R.N.

Scalaria indistincta, Thes. Conch. part 4. pl. 35. f. 141. *Scal. testâ elongatâ, imperforatâ, minutè spiraliter striatâ; anfractibus numerosis, gradatim crescentibus, suturâ distinctâ; varicibus numerosis, inæqualibus, rotundatis, decumbentibus, simplicibus; aperturâ parvâ, labio interno anticè subincrassato; colore albo.*

In Mr. Cuming's collection; brought from St. Blas, Gulf of California, by the Hon. Mr. Harris.

Scalaria subtilis, Thes. Conch. part 4. pl. 35. f. 137. *Scal. testâ elongatâ, angustatâ, spiraliter minutè striatâ; anfractibus numerosis, gradatim crescentibus, propè suturam elevatis; varicibus numerosissimis, laminatis, crenulatis, supernè angulatis; aperturâ parvâ; colore inter varices obscurè fusco.*

A small elongated turreted shell, to the beauty of which neither the description nor the figure can do justice: the varices are numerous, laminated, and regularly crenulated.

Collected by Mr. Cuming at the isle of Camiguing, in coarse sand at thirty fathoms; and at the isle of Corregidor, in sandy mud at thirty fathoms.

Scalaria concinna, Thes. Conch. part 4. pl. 33. p. 63. *Scal. testâ subovali, lævi, imperforatâ, obtusâ; anfractibus subprominentibus; varicibus numerosis, regularibus, obliquè in spiram continuis, subrotundatis; aperturâ ovali, labio interno tenui; colore pallidissimè fulvo.*

The whorls in this species are more prominent, the ribs more numerous, and the inner edge of the aperture thinner than in *Sc. multicostata.*

Found by Mr. Cuming in sandy mud at sixty fathoms, at Loay, isle of Bohol, Philippines.

Scalaria multicostata, Thes. Conch. part 4. pl. 34. f. 96. *Scal. testâ subovali, lævi, imperforatâ, obtusâ; varicibus subnumerosis, regularibus, obliquè in spiram continuis, subrotundatis; aperturâ ovali; labio interno anticè expanso et incrassato; colore pallidissimè fulvo.*

Rather oval and obtuse, with numerous regular, prominent, rounded varices; the anterior part of the inner lip is thickened and spread over the columella.

Brought by Mr. Cuming from Corregidor, Philippines.

Scalaria connexa, Thes. Conch. part 4. pl. 34. f. 98. *Scal. testâ ovali, subelongatâ, lævi, imperforatâ; suturâ profundâ; varicibus numerosis, laminatis, prominentibus, in spiram obliquè continuis; aperturâ ovali; colore inter varices obscurè fulvo.*

The numerous varices of this small species are laminar, prominent, and continued from whorl to whorl on the spire, as in the *Sc. Clathrus* of Linnæus, from which it differs essentially in not having the spiral rib at the lower part of the last whorl.

Brought from Sual, province of Pangasinan, isle of Luzon, by Mr. Cuming; found in sandy mud at seven fathoms.

Scalaria pulcherrima, Thes. Conch. part 4. pl. 34. f. 92. *Scal. testâ pyramidali, subventricosâ, spiraliter minutè striatâ, imperforatâ; anfractibus rotundatis, suturâ profundâ; varicibus subnumerosis, laminatis, extantibus, prominentibus, supernè in angulum acutum productis; aperturâ ovali, posticè acutangulatâ, anticè subquadratâ, labio interno subexpanso; colore inter varices fusco-purpurascente.*

Pyramidal, acute, rather ventricose, spirally striated, with a deep suture and with rather broad laminar varices, which are expanded into an acute angle near the suture.

Found by Mr. Cuming in black sand at a depth of four fathoms, at Dumaguete, isle of Negros.

Scalaria ovalis, Thes. Conch. part 4. pl. 34. f. 104. *Scal. testâ subovali, lævi; anfractibus paucis, ultimâ magnâ; varicibus novem, crassis, rotundatis; aperturâ ovali, margine incrassato, labio interno incrassato, expanso; colore inter varices pallidè cæruleo.*

The whorls of this very small shell are few in number, the last disproportionately large, with about nine very thick rounded varices; the aperture is oval, with a very thick edge, and the inner lip expanded.

Collected by Mr. Cuming in sandy mud at twenty to thirty fathoms, at Cagayan, province of Misamis, island of Mindinao.

Scalaria hexagona, Thes. Conch. part 4. pl. 33. f. 67. *Scal. testâ brevi, lævi, imperforatâ; anfractibus contiguis, varicibus sex, crassis, prominentibus, ad apicem obliquè continuis; aperturâ rotundatâ; colore albo.*

A short, imperforate, white species, with whorls closely united and strong varices, forming about six oblique continuous lines along the spire.

In the cabinet of Mr. Cuming: brought by Col. Moffat from Acapulco; found in the sands.

Scalaria Elenensis, Thes. Conch. part 4. pl. 34. f. 102. *Scal. testâ pyramidali, lævi, imperforatâ; anfractibus contiguis; varicibus sex; ad suturam subplicatis, irregulariter continuis; aperturâ ovali; colore albo.*

Resembling *Sc. unifasciata*, but without any band, and having the varices straighter and not so regularly continuous.

Collected by Mr. Cuming at Punta St. Elena, West Columbia; in sandy mud at six fathoms.

Scalaria obtusa, Thes. Conch part 4. pl. 33. f. 54. *Scal. testâ ventricosâ, pyramidali, imperforatâ, lævi; anfractibus contiguis; varicibus numerosis, crassis, rotundatis, continuis, supernè subangulatis; aperturâ rotundatâ, anticè subemarginatâ; labio interno spiraliter recurvo; colore albo.*

Rather short and thick, white, with numerous varices, which continue on the spire from whorl to whorl, and are slightly angular above; the inner lip of the aperture is spirally twisted, and forms an undulated notch at its juncture with the outer lip.

Collected by Mr. Cuming at Punta St. Elena, West Columbia; in sandy mud at six fathoms.

Scalaria Mindoroensis, Thes. Conch. part 4. pl. 34. f. 91. *Scal. testâ pyramidali, lævi, imperforatâ, tenui; anfractibus vix separatis; varicibus numerosis, simplicibus, ad suturam subirregulariter junctis; colore albo.*

A small, white, thin shell, slightly resembling *Sc. obliqua*, but less

oblique, and with more numerous and prominent varices ; the whorls are contingent.

Found by Mr. Cuming on the sands at Puerto Galero, island of Mindoro.

Scalaria polita, Thes. Conch. part 4. pl. 34. f. 99. *Scal. testâ tenui, elongatâ, lævi, imperforatâ ; anfractibus numerosis, vix prominentibus ; varicibus subnumerosis, tenuibus, in medio anfractuum obsoletis ; colore pallidè griseo.*

The whorls are numerous and not very prominent ; the varices appear as if worn away in the middle of the whorls.

Collected by Mr. Cuming at Xipixapi, West Columbia ; in sandy mud at ten fathoms.

Scalaria statuminata, Thes. Conch. part 4. pl. 35. f. 127. *Scal. testâ parvâ, crassâ, brevi, lævigatâ, imperforatâ ; anfractibus contiguis, vix prominentibus, anticè lineâ elevatâ cinctis ; varicibus quinque, prominentibus, ad apicem continuis ; anticè crassis, posticè in angulum elevatum expansis ; aperturâ subrotundâ, labio externo anticè tenui ; colore inter varices cæruleo.*

A small, short, thick species, with very prominent ribs, which are elevated and expanded into a broad angle at the upper part of the whorls and very thick at the lower ; they are united with each other so as to form five oblique prominent ridges up the spire.

Collected by Mr. Cuming at Payti, Peru ; in black sand at seven fathoms.

Scalaria bicarinata, Thes. Conch. part 4. pl. 35. f. 113, 114. *Scal. testâ subcylindricâ, elongatâ, imperforatâ, minutè cancellatâ ; anfractibus sex, latis, ad latera planis, ad suturam crenulatis, ultimo carinis binis in medio cincto ; aperturâ ovali, margine crasso, minutè crenulato ; colore ferè albo.*

A very curious little shell, with crenulated suture and two prominent keels in the centre of the last whorl ; the edge of the aperture is much thickened.

Found by Mr. Cuming in coarse black sand at seven fathoms, at Dumaguete, isle of Negros.

Scalaria fusca, Thes. Conch. part 4. pl. 35. f. 138. *Scal. testâ elongatâ, imperforatâ, spiraliter minutissimè striatâ ; anfractibus* 12, *subprominentibus, ultimo carinâ lineari anticè cinctâ ; varicibus tenuissimis, obliquis, ad suturam flexuosis ; aperturâ subovali, margine tenui ; colore obscurè fulvo, flammulis fuscis obliquis inter varices seriatim picto.*

An elongated species, with a very narrow but distinct keel on the lower part of the last whorl : the varices are very thin, and bent in near the suture. The shell is finely striated and prettily marked with flame-like patches of dark colour between the varices. There are two specimens in Mr. Cuming's collection, which were found on sand at Sierra Leone.

Scalaria acuminata, Thes. Conch. part 4. pl. 35. f. 130. *Scal. testâ elongatâ, imperforatâ, acuminatâ ; anfractibus* 15, *vix prominentibus, anticè carinâ tenui cinctis ; varicibus creberrimis,*

numerosis, tenuibus, curvilineatis; aperturâ ovali, margine tenui, labio interno tortuoso; colore pallidè fulvo, fasciis duabus, unâ prope suturam pallidâ, unâ in medio anfractuum latâ, distinctâ.

Elongated, keeled, with numerous whorls, and very numerous close-set curvilinear varices.

Found by Mr. Cuming in sandy mud at seven fathoms at Malacca.

Mr. Gould laid before the Meeting specimens of three new species of Mammalia, which he described as

Halmaturus Houtmannii. *Hal.* Mas *facie canescenti-cinereâ, fronte rufescente, spatio inter aures auribusque externè nigrescenti-cinereis; lineâ nuchali nigrescenti-fuscâ; dorso saturatè fusco griseo irrorato, colli corporisque lateribus, artubus anticis et posticis rufis, gutture et pectore fulvescenti-albis, abdomine cinereo; caudâ canescente, supernè et ad apicem nigrescente.*

Fœmina *mari assimilis, coloribus pallidioribus. Juniores nigrescenti-cinerei, colore apud dorsum saturatiore.*

Adult Male.—Face dark grizled grey, stained with rufous on the forehead; external surface of the ear and the space between the ears dark blackish grey; sides of the neck, shoulders, fore-arms, flanks and hind-legs rufous, which colour is palest on the flanks; a line of obscure blackish brown passes down the back of the neck, and spreads into the dark grizled brown of the back; throat and chest buffy white; under surface of body grey; tail grizled grey, deepening into black on the upper side and the extremity; the fur is somewhat short, coarse and adpressed; the base bluish grey, succeeded by rufous, then white, and the extreme tip black. Weight 12½ lbs.

Adult Female.—Is similar in colour to the male, but of a more uniform tint, in consequence of the rufous colouring of the shoulders and flanks being paler, and the grizled appearance of the back not so bright. Weight 8 lbs.

The young is dark grizled grey, approaching to black, particularly along the back. Weight 5 lbs.

	Adult Male. Ft.	In.	Female. Ft.	In.
Length from the nose to the tip of the tail ..	3	6	3	4
—— of tail	1	2¼	1	2
—— of tarsus and toes, including the nail ..	0	5¾	0	5⅜
—— of arm and hand, including the nails ..	0	6	0	4
—— of face from the tip of the nose to the base of the ear	0	4¼	0	4
—— of ear	0	2¼	0	2⅛

Halmaturus Dama. *Hal. vellere fusco, canescente, rubescente ad nucham, ad dorsum imum, et per artus anticos; facie cinereâ rufo lavatâ; fronte spatio inter aures, auribusque externè nigrescenti-cinereis; artubus posticis pallidè fuscis; caudâ canescente, corpore inferiore pallidè cinereo.*

General colour of the fur grizled brown, becoming of a reddish tint on the back of the neck, arms and rump; face grey, washed with rufous on the forehead; outside of the ears and the space between

blackish grey; hinder legs light brown; tail grizled grey; under surface of the body pale grey.

	Ft.	In.
Length from the nose to the extremity of the tail....	2	11
——— of tail	1	$2\frac{1}{2}$
——— of tarsus and toes, including the nail	0	$5\frac{3}{4}$
——— of arm and hand, including the nails	0	$4\frac{1}{4}$
——— of face from the tip of the nose to base of ear .	0	4
——— of ear	0	$2\frac{1}{2}$

This animal is closely allied to and is nearly the same size as *H. Thetidis*, but has much larger ears, and the fur much more dense and lengthened; the base of the fur is bluish grey, to which succeeds reddish brown, then silvery white, the extreme tips being black.

The above is the description of a female; the male will doubtless prove to be of larger size.

It is very numerous on the islands of the Houtmann's Abrolhos, and also inhabits Western Australia, where it is called 'Dama' by the aborigines.

LAGORCHESTES HIRSUTUS. *Lag. arenaceo-fulvus, dorso griseo irrorato; spatio circumoculari conspicuè rubescenti-fulvo; auribus mediocribus, externè cinereo-fuscis, intùs pilis albidis obsitis, pedibus flavescenti-fulvis.*

General colour of the fur, particularly on the hind quarters and under surface, rich sandy buff; that of the head and back having a grizled appearance, occasioned by each hair having a mark of greyish white near the tip; the fur, which is exceedingly soft, is blackish brown at the base, then rufous, the whole beset with numerous hairs, which gradually increase in length towards the lower part of the body, where they exceed the general length of the fur by nearly two inches, and being of a rich rufous tint, give the animal a very conspicuous appearance; broad space round the eye reddish buff; ears moderately large, greyish brown externally, and clothed with whitish hairs within; feet nearly uniform yellowish buff.

	Ft.	In.
Length from tip of nose to tip of tail	2	$3\frac{1}{2}$
——— of tail	0	$10\frac{1}{2}$
——— of tarsus and toes, including nail	0	$5\frac{1}{4}$
——— of arm and hand, including nails	0	$2\frac{3}{4}$
——— of face from tip of nose to base of ear	0	$3\frac{3}{8}$
——— of ear	0	$1\frac{3}{4}$

The above is the description of a male, from the York district of Western Australia, where it is called by the aborigines 'Woo-rup.' It is a very beautiful and well-marked species, distinguished from every other member of its genus by the long reddish hairs of the rump. The extreme tip of the tail is white, but whether this character is constant or not is at present unknown.

At the request of the Chairman, Mr. Gould read the following extracts from a letter he had received from Mr. Gilbert, describing the habits, &c. of some Mammalia and Aves of Western Australia:—

"With respect to the Kangaroos, I have heard of the little silver-

haired Lagorchestes (*Lagorchestes albipilis*), and have tried hard to procure a specimen; it is a species well known to the natives of Moore's river, by whom it is called 'Nar-nine,' and is only to be found in densely thick scrub on flats, and on the edges of swamps where the small brush Melaleuca grows so thickly that it is almost impossible for a man to force his way through; its runs being under this, the animal escapes even the quick eye of a native. The only possible means of obtaining it is by having a number of natives to clear the spot, and two or three with guns and dogs to watch for it.

"This beautiful little animal makes no nest, but squats precisely like a hare, as I have been assured by Mr. Johnson Drummond. Of the other species with white behind the ears I can learn very little: are you satisfied it is not a variety? I have seen many with white spots about different parts of the head, which is said by all the hunters to be a common occurrence; the only character which appears to me to approach a specific difference is the redness of colouring, which has been often observed by hunters; the woolly nature of the fur is only the winter covering common to all of them.

"The grey kangaroo, *Macropus Ocydromus*, Gould, of which I have a very interesting series, has very thin hair in summer, while in winter the coat is thick and woolly.

"The male is called *Yoon-gur* and the female *Work* by the aborigines. This large kangaroo is tolerably abundant over the whole colony of Western Australia, from King George's Sound, south, to forty miles north of Moore's river, the farthest point I have reached; it does not appear to confine itself to any peculiar description of country, being as often seen in the gum-forests, among hills, as on the open plains and clear grassy hillocks; it is however more numerous in the open parts of the country, where it is not so liable to surprise. In travelling from Guilford to York, from two to four or five may occasionally be met with; but farther in the interior, particularly at Gwangum plains, herds of thirty to fifty may often be met with: further south, beyond Kojenup, they are still more numerous; in fact, I have never seen in any part of Australia so large a herd as the one I met with on the Gordon plains in 1840; at the most moderate calculation there could not have been less than five hundred kangaroos; several of the party, in their astonishment, considered there were even a greater number than I have stated.

"The large full-grown male is termed a Buck or Boomer, and attains a great size, when he becomes a most formidable opponent to the best dogs in the country, few of which will ever run a large Boomer; this may in some degree account for the few instances of very large ones being killed. It is not by their greater speed that they are enabled to escape; on the contrary, their great weight in some measure incapacitates them for running fast, or to any great distance, so that almost any dog may overtake them; instead, therefore, of running away, the Boomer invariably turns round and faces his pursuers, erecting himself to his full height, if possible with his back against a tree, and thus awaits the rush of the dogs, endeavouring to strike them with his powerful hind-toe, or catching them in

his fore-arms, and while thus holding them, inflicting dreadful and often fatal wounds with his foot. Old dogs well broken in, and accustomed to hunting the Boomer, will keep him at bay by their barking till the hunter comes up, who is generally furnished with a short heavy stick, and with a blow or two on the head brings the animal down. Even the hunter often runs a hazard, for a Boomer will frequently, on the approach of man, leave the dogs and attack his new opponent most fiercely; and at times it is no easy matter to avoid being severely cut in attempting to kill it. When closely pursued it takes to the water, and as the dogs approach, catches them in its arms and holds them under him till drowned. If the water be too shallow for drowning them, it has been known to catch one dog and place it beneath its feet, while courageously waiting the approach of a second. The swiftest runner is the female of the first year before having young, and of the second year with her first young; at this age her speed is so great that she is termed the 'Flying Doe': if she obtains anything like a fair start, she will give the fleetest dogs a long and severe run, and will frequently succeed in outstripping them; upon finding herself too closely pressed she attempts to evade the dogs by making a sudden leap, almost at a right angle with her course, and the dogs, not unfrequently when very close to her, and at full speed, bound past her to such a distance, that by the time they regain the track the kangaroo has gained so much ground as to get fairly away; but this stratagem often accelerates her death, for in turning off so suddenly the whole weight is thrown upon one limb; the leg is consequently broken, the animal falls, and the next moment becomes an easy prey. Even large bucks are sometimes taken in this way: in their flight and anxiety to escape the dogs, they often run against a stump or a tree with such violence as to be killed on the spot.

"It would scarcely be supposed, from seeing this animal in confinement, where it appears so quiet and harmless, that it can be excited to rage and ferocity; yet such is the case in a state of nature. Upon finding itself without a chance of escape, it summons up all its energies for a last struggle, and would often come off victor if it had dogs alone to contend with: the moment it sees the approach of man, it appears to know instinctively that he is its most formidable opponent; its lips are then curved and contracted; its eyes sparkle with rage, and seem ready to start from their sockets; its ears are in rapid and constant motion, and it utters its peculiar though not loud voice—a sort of smothered grunt, half hiss or hard breathing; its attention is totally withdrawn from the dogs to its new enemy; regardless of their rush, it loses its former advantage; and the dogs having once fairly got hold, the animal is easily brought down.

"If a female with a tolerably large young one in the pouch be pursued, she will often, by a sudden jerk, throw the little creature out: whether this is done for her own protection, or for the purpose of misleading the dogs, has been debated by hunters; I am inclined to think the former is the case, for I have observed that the dogs

pass on without noticing the young one, which in general crouches in a tuft of grass, or hides itself among the scrub without attempting to run or make its escape: the mother, if she eludes her pursuers, doubtless returns for her offspring.

"The kangaroos inhabiting the forests are invariably much darker and have a thicker coat than those of the plains; the young are at first of a very light fawn-colour, and get darker until two years old; from this age they again become lighter in colour, and the old males become of a very light grey; the coat, as already mentioned, being in the summer thin and hairy, and in the winter of a more woolly character. It is no unusual occurrence to find them with white marks on the head, particularly a white spot between the eyes or on the forehead; in one instance I observed the whole of the throat, cheeks, and upper part of the head spotted with yellowish white. Albinoes have been frequently met with. The largest and heaviest kangaroo of this species, of which I have any authentic account, was killed at the Murray, and weighed 160 lbs.*"

"*Halmaturus manicatus*:—Brush and Blue Kangaroo of colonists; *Goorh-a*, aborigines of Perth; *Quarra*, aborigines of the interior.

"This is by far the swiftest and most difficult kangaroo to procure with dogs, not only from its fleetness, but also from the zigzag manner of its successive leaps and the thick brush which it inhabits; it is very rarely seen in the open country, dwelling in scrubby districts, and the facility with which it bounds off and rounds the clumps of bushes, enables it to make its escape with comparative ease: during the heat of the day it may be seen under the shade of a tree or thick clump of bushes, and may be often approached within a few yards before it bounds from its cover, thus affording a tolerably easy shot. Weight from 17 to 21 lbs."

"*Anous stolidus*.—The Noddy and its allied species are the most numerous of all the inhabitants of the Houtmann's Abrolhos, breeding in prodigious numbers; the bird lays in November and December, forming a nest of sea-weed about six inches in diameter, and varying in height from four to eight inches, but without anything like regularity of form; the top is nearly flat, there being but a very slight hollow to prevent the egg rolling off; for, like others of the *Sternidæ*, they never lay but a single egg. The nests are so completely plastered with their excrement, that at first sight it appears to be almost the only material; they are either placed on the ground, in a clear open space, or on the tops of the thick scrub, over the *Sterna fuliginosa*: these two species incubate together in the utmost harmony, the bushes to an immense extent wearing a mottled appearance, from the great mass of birds of both species perched on the top; the male *Sterna fuliginosa* sitting quite close to the nest of the Noddy, while its mate is beneath, performing her arduous duties of incubation. On walking among these birds' nests, I was surprised to observe the extreme tenacity with which they kept their post; in fact they would not remove off the egg or young, but suffered themselves to be fairly

* The head, feet and fore-arms were exhibited.

trod upon, or taken off by the hand; and so thickly were these nests placed, that it was no easy matter to avoid crushing either birds or eggs at every step. In the middle of January I found the eggs very nearly ready to hatch, and but few young birds; in numerous instances the bird would suffer me to take it by the wing and throw it off the nest, but would immediately return, although I was still standing close to the spot. There would be an overwhelming increase of this species yearly but for one check which nature has provided against it in the presence of a lizard, which is extremely abundant about their breeding-places, and which finds an easy prey in this and *S. fuliginosa*. I am satisfied, from constant observation, that on an average, not more than one out of every twenty birds hatched ever reach maturity, or live long enough to take wing; besides this, great numbers of the old birds are constantly killed: these lizards do not eat the whole bird, but merely extract the brains and vertebral marrow; the remainder however is soon cleared off by the *Dermestes lardarius*, which is here in amazing numbers, and gave me a great deal of uneasiness and constant trouble to preserve my collection from their repeated attacks. I did not observe the Noddy inhabiting any other but South Island; they do not appear to go far out to sea to feed, finding an abundance of food immediately outside the outer reef; nor did I in any one instance observe it feeding in the smooth quiet water between the outer reef and the islands. Their food consists of small fish, small mollusca, medusæ, cuttle-fish, &c. Irides brown, bill and legs blackish grey; flight somewhat heavy and very irregular."

"*Anous* ——? (Lesser Noddy).—This, although an allied species to the Noddy, is totally different in its habits of incubation, and is even much more numerous than the former; it builds a nest of sea-weed on the branches of the mangrove, from four to ten feet above the ground; like the Noddy, however, it is truly gregarious, arranging their nests as closely as possible; the sea-weed is merely thrown across the branch without any regard to form, till they have a heap varying from two to four inches in height, the long pieces of sea-weed in many instances hanging beneath the branch, which makes it appear a much larger structure: their nests and the branches of the trees are completely white from their excrement, throwing out a most disagreeable and sickly odour, which is perceptible at a considerable distance. Although there are large groves of mangroves on other islands, this bird only inhabits those of South Island. I have seen many vast flocks of birds, but I must confess I was not at all prepared for the surprise I experienced in witnessing the amazing clouds (literally speaking) which these birds present when congregating in the evening; while they had their young to feed, their departure and return with food during the day in one direction had a most singular appearance. From their breeding-place, across the smooth water to seaward, beyond the outer reef, is a distance of about four miles, and this entire distance, in their one and regular track, wore the appearance of one continuous dark line, from their prodigious numbers: after the young were

enabled to accompany the parent birds, I observed they all left the breeding or roosting-place in the morning and did not again return till evening, apparently the first comers waiting the arrival of the last before finally roosting for the night; it is when thus assembling that the amazing number is seen to perfection: even Audubon, who has been so accustomed to see such vast flocks of the passenger pigeon, could hardly avoid expressing surprise if he had an opportunity of seeing these birds at sunset, moving in one immense mass over and around their roosting-place; while the noise of the old birds' quack and the piping whistle of the young ones is almost deafening. This bird, like its congener, lays but a single egg; it commences incubating in December, and appears to be the exclusive inhabitant of the mangroves; and while sitting on its egg or tending its young is as easily caught as the Noddy, suffering itself to be taken off its nest rather than leave it. As an article of food it was the favourite, several hundreds being killed almost daily during our stay on the island. From the circumstance of this bird inhabiting the upper branches may be attributed its numbers being greater than any other of the numerous birds which inhabit the islands, the lizards being unable to climb the branches with the facility necessary for capturing their prey, and it thus escapes their repeated attacks, to which the others must at all times be subject on the ground."

Mr. L. Fraser laid upon the table three new species of Birds, which he described as

Lagopus ferrugineus. *Lag. dorso, humeris, et uropygio, nitidè ferrugineis; singulis plumis in medio fusco notatis; capite et collo fuscis; plumarum radicibus albis; primariis cinereis; caudâ supernè cinereâ, ferrugineo marginatâ et ad apicem albâ; femoribus tarsisque ferrugineis nigro atque albo, vix distinctè fasciatis; rostro et unguibus nigris, ceromate et digitis flavis.*

Upper surface dark brown, mottled slightly with white on the head and neck; tail above the basal half white, terminal brown, totally white beneath, the feathers on the breast having brown quills and those on the sides and thighs spotted with brown.

Total length 23½ in.; wings, 17; tail, 10; gape, 1⅞; tarsi, 3.

Hab. Mexico.

Mus. Zool. Soc. Lond.

There are three specimens of this bird in different stages of plumage in the Society's collection, all from Mexico; one was presented by John Taylor, Esq., another by N. A. Vigors, Esq.

Psittacus Timneh. *Ps. saturatè cinereus, uropygio, abdomine imo, crisso, et femoribus pallidè cinereis, caudâ saturatè ferrugineo-rubrâ, rectricibus singulis acutis.*

Hab. Timneh country, Sierra Leone.

Le Perroquet cendre noir; Le Vaillant, Hist. Nat. des Perroquets, pl. 102.

Mus. Zool. Soc. Lond.

This bird is confined to that part of Western Africa near Sierra Leone; it is never seen so low down as Cape Coast, which is the

locality of the *Psittacus erithacus*, from which it differs in its much darker tints of colouring, and the tail-feathers terminating in a point.

Plyctolophus citrino-cristatus. *Pl. albus, cristâ citrinâ, plumis auricularibus sulphureo leviter tinctis.*

In vivario, Zool. Soc. Lond.

About the size of *Pl. sulphureus*.

ENTOMOLOGICAL SOCIETY.

January 2, 1843.—W. W. Saunders, Esq., F.L.S., President, in the Chair.

Mr. S. Stevens exhibited a living specimen of *Odacantha melanura*, recently captured in the Hammersmith marshes.

The President exhibited some wheat, recently imported from India, greatly infested with *Calandra granaria*, upon which he made some observations in reference to the very great advantages which would result to the Indian agriculturists in case the grain could be imported into Europe free from the weevil: whereupon Mr. Edward Doubleday stated, that in North America the Indian corn is attacked by a small beetle, belonging to the family *Engidæ*, within a very few months after it is full-grown.

Mr. Westwood read a notice of a new genus and species of British Homopterous insects belonging to the family *Aphidæ*, found in different stages of growth at the roots of Jerusalem artichokes. They are of a broad ovate form, destitute of wings, and of a white or dirty whitish colour; their hind feet are singularly inserted quite at the sides of the body, whereby the insect is able to throw them upwards and backwards and forwards; the hind tarsi are very long and apparently 1-jointed; the rostrum is elongated; the antennæ 6-jointed; the abdomen destitute of the saccharine tubercles. Mr. Westwood proposes to name it *Rhizobius Helianthemi*, it not being previously described by Burmeister or Hartig.

Mr. Westwood also read an extract from a letter from M. Guérin Méneville, containing a new distribution of the species of the genus *Rhipicera*, since published in the 'Species et Iconographie générique des Insectes.'

February 6.—George Newport, Esq. (who had been elected President at the Anniversary on the 23rd of January), in the Chair.

The President read a notice of the offer of two prizes of 5*l.* 5*s.* each by the Rev. F. W. Hope, for the best memoir on insects injurious to market gardens, and for a complete bibliographical synopsis of entomological works published in this country.

Mr. Longley exhibited a Gynandromorphous specimen of the common Vapourer Moth (*Orgyia antiqua*).

The President having communicated to W. W. Saunders, Esq., the late President of the Society, the request proposed at the Anniversary Meeting, that he would deliver his Anniversary Address this evening, Mr. Saunders delivered the same: whereupon a vote of thanks was unanimously passed to him, accompanied with a request

that he would permit it to be printed for distribution amongst the Members.

The following memoirs were read:—

"Notice of the occurrence in Sherwood Forest, Nottinghamshire, of *Trypodendron lineatum*, a new British species of wood-boring *Coleoptera*." By T. Desvignes, Esq.

"A Decade of new *Coleoptera* from Assam." By Captain Frederick Parry, F.L.S. &c.

1. Cicindela Assamensis, P. *Atro-picea, elytris maculis 4 flavis, corpore infra nitido viridi trochanteribus rubris.* Long. corp. lin. $9\frac{1}{2}$.
2. Cicindela latipennis, P. *Berylino-viridis, fronte albido, disco subcupreo-æneo, elytris lunulis tribus lateralibus flavis alteraque fere media ad suturam vergente apicibus flavis.* Long. corp. lin. 8.
3. Heptodonta (Gen. Cicindelarum) Hopei, P. *Viridis, fronte albido, lateribus brunneis, thorace cylindrico elytrisque concoloribus immaculatis apicibus subtruncatis, corpore infra viridi, femoribus ad basin flavis.* Long. corp. lin. $7\frac{1}{2}$.
4. Calosoma nigrum, P. *Nigrum, mandibulis porrecto-falcatis indentatis, thorace transverso-rotundato parvo, elytris thorace quadruplo longioribus, postice dilatatis et lineato-punctatis, punctis in 3 lineis positis, corpore infra atro, pedibus concoloribus.* Long. corp. lin. 14.
5. Athyreus frontalis, P. *Castaneus, antennis flavis, capite antice nigro, postice castaneo, thorace ad marginem anticum parum elevato, postice valde excavato, foveola utrinque fortiter impressa, pedibus fuscescentibus, femoribus rubris.* Long. corp. lin. $8\frac{1}{2}$.
6. Mimela sapphirina, P. *Læte cyanea, capite marginato virescenti, thorace nitido violaceo, elytrisque striato-punctatis sapphirinis, fascia violacea parum distincta, fere ad latera posita; corpore infra atro-piceo, femoribus pallidioribus.* Long. corp. lin. $6\frac{1}{2}$.
7. Alaus irroratus, P. *Niger, maculis minutis flavis irroratis, capite fere atro, thorace obscuro subtilissime punctis asperso, elytris striatis, macula atra majori ad latera posita aliisque flavis per totum discum aspersis.* Long. corp. lin. 15.
8. Eumolpus pyrophorus, P. *Violaceus, capite læte cyaneo, thorace concolori, elytris igneo-æneis, humeris apicibusque cyaneis, corpore infra violaceo, pedibus concoloribus.*
9. Lamia (Batocera, Dej.) Calanus, P. *Atro-cinerea, antennis atris et scabrosis, thorace bimaculato, maculis albis, elytrisque ad apicem bispinosis, ad basin scabris, disco maculis albis 8 notato, corpore infra atro-cinereo, pedibus cinereo-tomentosis.* Long. corp. lin. 26.
10. Lamia Porus, P. *Atro-cinerea, antennis corpore longioribus scabrosis, thoracè unimaculato, scutello concolori, elytrisque ad suturam et ad latera parum mucronatis, ad basin scabris, maculisque puniceis albo-notatis.* Long. corp. lin. 20.

Obs. Captain Parry suggests the possibility that the spots on this species may have been artificially coloured, although other allied species exhibit spots of orange and yellow running into red and pink.

"On the means by which the Honey-bee finds its way back to the Hive." By George Newport, Esq., President.

March 6.—George Newport, Esq., President, in the Chair.

Mr. Edward Doubleday exhibited a volume of drawings of Lepidopterous larvæ, executed by the grandson of the late Mr. Standish. Also two plates of Indian *Lepidoptera* (*Charaxes*, sp.) since published in the 'Annales' of the Entomological Society of France.

Mr. F. Bond exhibited specimens of *Polyommatus Arion* and *Anthrocera Loti*, taken at Barnewall Wold, Northamptonshire, in July 1842.

Mr. Westwood exhibited an extensive series of *Goliath* Beetles of the genera *Rhomborhina* and *Trigonophorus*, from the collection of the Rev. F. W. Hope, including several new species recently obtained in a large collection of Indian insects. Also a drawing of a larva received from J. Walton, Esq., as that of a species of *Bruchus* found in the interior of beans, but which Mr. Westwood regarded as a lepidopterous larva (possessing four pairs of ventral and one pair of anal prolegs, in addition to six thoracic feet). No *lepidopterous* larva had however been hitherto observed possessing such habits.

A letter was read from W. Spence, Esq., relative to the action of the pulvilli of flies and other insects capable of walking upon upright or inverted planes of glass, &c.

"Descriptions of some new species of *Alcides* (a genus of *Curculionidæ*) from the Philippine Islands." By G. R. Waterhouse, Esq.

GEOLOGICAL SOCIETY.

Feb. 21, 1844, *continued*.—The following papers were read :—

"Remarks on *Sternbergia*." By Mr. J. S. Dawes.

The author considers the fossils of this anomalous genus of extinct vegetables as merely casts of the medullary cavities of exogenous trees, similar to that at Darlaston, lately described. The transverse plates which compose the interior of some of these borders, he considers as agreeing with the laminæ of the pith; and the rings on the external surface of others as produced by the same cause. He described specimens in which the so-called *Sternbergia* formed the centre or pith of fossil stems.

"On a Fossil Crustacean from New Holland." By Prof. Thomas Bell.

This, the only fossil crustacean as yet found in Australia, was procured by Lieutenant Emery, and forwarded by Mr. W. S. Macleay, who considered it as probably a *Thalassina*. Prof. Bell regards it as a new *Thalassina*, nearly allied to the only known living species of that genus, and names it *T. antiqua*.

March 6.—A paper was read, entitled, "Contributions to the Geology of North Wales." By Mr. Daniel Sharpe.

The observations contained in this memoir were made during a tour through a large part of North Wales, with the object of endeavouring to ascertain what beds lie below the Silurian rocks which have been described by Mr. Murchison, and whether any organic remains are to be found in them. Mr. Sharpe enters into full particulars on the geology of many localities, commencing at Llangollen,

in the district examined by Mr. Bowman, and working gradually westward. The details do not admit of a brief abstract. In comparing the Silurian formations of North Wales with those of Shropshire, &c., Mr. Sharpe calls attention to the prevalence of slaty cleavage in the former, to the greater thickness of the Welsh formations, and to the scarcity of organic remains in North Wales in beds which elsewhere are crowded with fossils. He concludes by some observations on slaty cleavage.

A Note, by the Curator, on the fossil species of *Criseis*, discovered by Prof. Sedgwick and Prof. Ansted, was also read at this meeting.

March 20.—The following papers were read :—

1. "Report on the Collection of Fossils from Malta and Gozo, presented by Lieut. Spratt, R.N." By the Curator.

From an examination and comparison of the fossils, it would appear that the Maltese Islands are formed of tertiary strata of the Miocene period, from which there are between eighty and ninety species of organic remains in the Society's collection.

2. "On the Origin of the Gypseous and Saliferous Marls of the New Red Sandstone." By the Rev. David Williams.

The author gives an account of a section through the west end of Worle Hill, near Weston-super-Mare, which he considers throws important light on the origin of the marls in question. He classes them among formations of volcanic origin.

3. Extract of a Letter addressed to the Rev. Dr. Buckland, by Mr. W. C. Trevelyan, "On some remarkable Fractured Pebbles from Auchmithie, near Arbroath."

These pebbles are found in the old red conglomerate, and consist of granite, porphyry, gneiss, jasper and reddish quartz. They are fractured and contorted in a remarkable manner, and present appearances of softenings, and of adhesions subsequent to the fracturing.

April 3.—The following papers were read :—

1. "On the Traces of the Action of Glaciers at Porth Treiddyn, in Caernarvonshire." By Mr. R. W. Byres.

The author notices a number of evidences of glacial action, instances of rounded, polished, furrowed and striated rocks in the neighbourhood of Tremadoc, similar to those observed in several localities around Snowdon by the Rev. Dr. Buckland.

2. "On the occurrence of Fossils in the Boulder Clay." By Mr. R. Harkness.

Fossils are rare in the boulder clay, and are only found in the thicker parts of it. Such portions the author considers as having been deposited in a deep sea, the lower parts of which had a temperature sufficiently warm for the support of organized beings. In the thicker beds the boulders are rounded and polished. Such parts of the clay as are free from fossils, and contain angular boulders, Mr. Harkness considers to indicate the former existence of a shallow sea, with a temperature so cold as to prevent the existence of animal life. Fossiliferous localities occur in the boulder clay of the south-western parts of Lancashire, where the marl abounds with remains of shells, mostly in a fragmentary state.

3. A letter was read from Dr. Owen Rees on the question of the existence of Fluoric Acid in recent Bones, which the experiments of Dr. Rees would go to disprove. The bones examined by him were tested both before and after calcination, but in no case could he detect the least trace of fluoric acid in recent human bone. In fossil bones it exists in large proportions.

April 17.—The following papers were read:—

1. "Observations on the Geology of the Southern Part of the Gulf of Smyrna and the Promontory of Karabournoo." By Lieut. T. Spratt, R.N.

The author takes up the geology of the neighbourhood of Smyrna at the point where the observations of Messrs. Strickland and Hamilton terminate, and gives a detailed account of the schists and limestones of Mount Corax and Cape Karabournoo, and of the extensive freshwater tertiary formation which borders them on the sea-coast, and is continued into several of the neighbouring islands. He notices the presence of igneous rocks of two distinct ages, viz. serpentine, older than the tertiary, and trap, which had been erupted after the deposition of the tertiary, greatly disturbing, and in places overflowing it. His observations prove the existence at a former period of a great freshwater lake in the eastern part of the Archipelago, where now there is a deep sea.

2. "Note on the Fossils found in the Tertiary Formations described in the preceding paper." By the Curator.

An examination of the fossils found in the freshwater beds, described by Lieut. Spratt, shows that formation to have been deposited during the Eocene period.

3. "On the Remains of Fishes found by Mr. Kaye and Mr. Cunliffe in the Pondicherry Beds." By Sir Philip Grey Egerton, Bart., M.P.

In this paper the author describes fourteen species, mostly new, twelve of which belong to the placoid order, one is a ganoid, and one a cycloid fish. Among them is *Corax pristodontus*, identical with the Maestricht species. From the evidence afforded by the examination of these fishes, Sir Philip Egerton takes the same view of the age of the beds which was inferred by Prof. E. Forbes from the invertebrate remains, considering them as belonging to the cretaceous æra, though he is inclined to place them higher in the series.

4. "On the occurrence of a Bed of Septaria containing Freshwater Shells, in the series of the Plastic Clay at New Cross, Kent." By H. Warburton, Esq., M.P., F.R.S., Pres. G.S.

The bed described does not form a continuous stratum, but occurs with interruptions and intervals in the condition of Septaria, which contain remains of shells of the genera *Paludina* and *Unio*. A section of the locality, showing the position of the bed, was made by Mr. Simms. In France similar associations of freshwater remains have been noticed in the plastic clay series by M. D'Archiac.

May 1.—The following papers were read:—

1. "Report on the Fossils from S. Fé de Bogota, in South America, presented to the Society by Mr. E. Hopkins." By the Curator.

These fossils belong to seventeen species of Mollusca, of which

nine are identical with species from the same locality, described by Von Buch, D'Orbigny, and Lea. They are from a dark compact limestone, which the reporter regards as a member of the lower part of the cretaceous system. Eight of the species are new.

2. "Comparative Remarks on the Sections of the Strata below the Chalk, on the Coast near Hythe in Kent, and Atherfield, in the Isle of Wight." By Dr. Fitton.

In this paper the author enters into an elaborate review of the state of our knowledge of the lower greensand in England, and compares the several deposits and their fossil contents. After commenting on the relations of that formation at Hythe, with the several strata of the Atherfield section, and showing the comparative state of our knowledge of them when he read his memoir on the sub-cretaceous strata in 1824, with the state of the subject at the present day, he proceeds to examine the researches of M. Montmoulin in Switzerland, M. Dubois de Montperreaux in the Caucasus, MM. Leymerie and D'Orbigny in France, and M. Roemer in Germany, and to prove the identity of the beds styled by some of those authors Neocomian with his lower greensand. Regarding both names as objectionable, the former on account of its being derived from a locality which will not serve as a type for the formation, and the latter because it implies erroneous relations, he proposes the term "*Vectine*," from the island in which we find the strata of this part of the cretaceous system best displayed.

3. A letter from Mr. Simms was read, noticing the occurrence of Lower Greensand clays resting on the Wealden at the cutting near Jeston turnpike, on the Maidstone line of railway.

4. "On the Section of the Lower Greensand, between Black Gang Chine and Atherfield Point." By Capt. Boscawen Ibbetson and Prof. E. Forbes.

After describing sixty-three distinct strata, presenting a total thickness of 843 feet, which constitute the lower greensand in this section, the results of a chemical examination of the several strata were stated. The strata were grouped under three divisions, the lowest consisting of fossiliferous clays, the middle of Gryphæa sands, and the upper of more or less ferruginous sands, mostly free from fossils. An inquiry was entered into respecting the conditions under which these beds were deposited, and the state of animal life in the cretaceous seas during their formation. The distribution of their fossils was given in detail, and the results of the inquiry stated as proving the unity of the lower greensand, considered as a member of the cretaceous series. Capt. Ibbetson laid before the Society a model of the section, on the scale of three feet to the mile, constructed by himself from trigonometrical survey, on which the several strata described in the paper were laid down minutely.

5. "Description of the mouth of a *Hybodus*, found by Capt. Ibbetson in the Isle of Wight." By Sir Philip Grey Egerton, Bart., M.P.

This fish was found at the junction of the Wealden with the lower greensand. The specimen sets at rest the question of the relative characters of the upper and lower teeth, and the general contour of

the individuals composing the genus *Hybodus*, confirming the views of Prof. Agassiz. The species is new, and Sir Philip Egerton proposes to name it *Hybodus Bassanus*.

6. The President read extracts from letters lately addressed by M. Dubois de Montperreaux and by Prof. Agassiz to Capt. Ibbetson, on the subject of the Neocomian. The former of these geologists states that the Neuchatel beds cannot be regarded as complete, or as the type of that formation, which he considers is best developed in the Crimea and Caucasus. The latter considers the Neocomian as a peculiar stage, and that the very lowest of the cretaceous system.

May 15.—The following papers were read :—

1. A letter from Dr. Ick on some new fossil Crustacea, from the South Staffordshire coal-field.

2. "On the Geology of Cape Breton." By Mr. R. Brown.

The newest stratified rocks in the island of Cape Breton belong to the coal formation. The coal-field of Sidney occupies an area of 250 square miles, and appears, from the dip of the beds, to be a portion of a still more extensive field. The coal measures repose on millstone grit of variable thickness and great extent. Beneath the millstone grit lies carboniferous limestone, associated with extensive beds of gypsum and marls. These gypsiferous beds lie upon conglomerates, which pass downwards into slates, corresponding to the grauwacke formation in Europe. In places the eruption of red granite has converted the schists into white marble. Igneous rocks of various forms, granites, porphyries, greenstone and trap, occupy a considerable portion of the island.

3. "On the anthracite formation of Massachusetts." By Mr. Lyell.

The author states that the fossil plants associated with the anthracite of Wrentham, Cumberland and Mansfield on the borders of the States of Rhode Island and Massachusetts, are of true carboniferous species. The strata containing them, as shown by Hitchcock, Jackson and others, pass into mica-schist, clay-slate, and other metamorphic rocks. The bed of plumbago and anthracite, two feet thick, at Worcester, Massachusetts, is separated from the anthracite before mentioned, by a district of gneiss, thirty-five miles wide. This bed Mr. Lyell regards as coal in a still more completely metamorphic state, all the volatile ingredients having been discharged and carbon alone remaining, the accompanying coal-shales and grits having been turned into carbonaceous clay-slate, mica-schist, with granite and quartzite. No similar beds are found in the North American Silurian formations.

MISCELLANEOUS.

CAPTURE OF HEMIPODIUS TACHYDROMUS IN BRITAIN.

To the Editors of the Annals of Natural History.

Gentlemen,—I have recently received a bird which appears to me to be new to this country ; it is a Quail, having no back toe, and is

not mentioned, I believe, in any work on British ornithology to which I have access; but in Dr. Latham's 'General History' it is described as the *Perdix Gibraltarica*, with which my specimen appears to agree. The bird was shot by the gamekeeper on the Cornwell estate in this county, about three miles from hence, and has been kindly presented to me. It was found in a field of barley, of which kind of grain, by the by, hundreds of acres are still standing, with no prospect of being harvested in a proper state. Before I proceeded to preserve the bird, I took the measure of its various parts, the colour of its eyes, bill and feet, its weight, &c., after which I found its description in the work above alluded to. It was shot on the 29th of October last, since which time another has been killed near the same spot by the same person, but its head was shot off, and otherwise so mutilated as to be unfit for preservation: this might probably complete the pair, mine being a male bird. It had in its gizzard two or three husks of barley, several small seeds similar to charlock, some particles of gravel, and was very fat. It was considerably injured by the shot, but I have set it up in the best manner I could, and consider it a valuable addition to my small collection of British birds. Should this prove to be the only known instance of the capture of the bird in Britain, I shall feel glad in having saved it from oblivion.

I am, Gentlemen, your obedient servant,

Chipping Norton, Oxon, Nov. 11, 1844. THOS. GOATLEY.

[The bird in question is the *Hemipodius tachydromus* of Temminck, which is figured in Mr. Gould's 'Birds of Europe,' vol. iv. plate 264. Mr. Gould, to whom we have shown Mr. Goatley's letter, considers this one of the most interesting additions to the British fauna that has occurred for many years.—ED.]

ELATINE HYDROPIPER.

Mr. W. O. Newnham of St. John's College, Cambridge, has found this very rare plant in two ponds near Farnham, Surrey, on opposite sides of the town, namely, Frensham Pond and Cuck Mills Pond: in both places it was accompanied by *E. hexandra*. It is a most interesting addition to the flora of the south of England, and the young naturalist by whom it has been discovered deserves great credit for accuracy of observation. The only recorded localities are in Anglesea and Ireland.—C. C. B.

HURA CREPITANS.

A fruit of *Hura crepitans* from which the seeds had been removed (probably by cutting them out), and which had been kept by M. Poncet in a glass for ten years, suddenly burst with a noise like the report of a pistol, and its divisions with the fragments of the glass were scattered about the room. M. Schlectendal informs us that he once left a perfect fruit of this plant on the corner of a stove, and was in the next room, when it burst with a noise as if a quantity of china had fallen to the ground, and its valves and seeds were scattered to the extremities of a room twelve feet square.—*Botanische Zeitung*, Nov. 8, 1844.

FORMATION OF CELLS IN THE APICES OF ROOTS.

Nägeli in the 'Linnæa,' vol. xvi. p. 252, says, "If exceedingly fine sections be made at the *punctum vegetationis*, where the different layers of the root meet as in one focus, and if some cells be then isolated by laceration, there will be found among them: 1. cells with one cytoblast; 2. cells with two cytoblasts; 3. cells with two cytoblasts and a septum between them. This I usually saw when examining the actually growing apex of a radicle of *Lilium*, *Tulipa*, or *Iris*. Once I saw a large, longish nucleus which appeared just in the act of division; another time, within one cell, two young cells each with a nucleus, which had not yet grown broad enough to form a septum by the union of their membranes. I feel justified by these facts in saying quite decidedly, that, in the apex of the roots of these plants, the growth takes place in such a manner that two cell-nuclei originate in each mother-cell, and around each of these nuclei a new cell. Unger maintains that the usual mode of origin in elementary organs is the formation of septa in the cells, *i. e.* self-division; the formation of new cells in those already existing is limited to a few cases; of the development of cell-nuclei into cells, I could observe nothing." Nor I either. I also saw light-coloured corpuscules in those root-cells, sometimes surrounded by a bright circle, but am inclined to affirm decidedly that no true cells originate from them.—*Link in his Report on Physiological Botany for* 1842 and 43.

On the Demerara Pink-root, or Spigelia Anthelmia*. By Dr. George R. Bonyun†.

The indigenous species of pink-root, which is in great repute among the labourers of British Guiana, particularly those residing on the banks of the rivers, has not as yet, I believe, in this colony been sufficiently brought to the notice of medical men, nor its relation to the *Spigelia marilandica*, or officinal pink-root, determined. This herb, which grows in great abundance on the west and Arabian coasts, and on the banks of the rivers, is identical with that described by Patrick Browne, anno 1756, p. 156, in his 'Civil and Natural History of Jamaica,' as "Anthelmintia or wormwood." He there says, "This vegetable has been long in use among the Negroes and Indians, who were the first acquainted with its virtues, and takes its present denomination from its peculiar efficacy in destroying worms, which I dare affirm, from a great number of successful experiments, it does in so extraordinary a manner, that no other simple can be of equal efficacy in any other disease, as this is in those which proceed from these insects, especially when attended with fever or convul-

* *S.* Caule herbaceo ramoso, foliis oblongis utrinque attenuatis, summis quaternis, racemis spicatis staminibus corolla brevioribus.—*Sprengel*, vol. i. p. 584.

† Read before the Agricultural and Commercial Society of British Guiana, 9th Sept. 1844.

sions." Griffith Hughes, in his 'Natural History of Barbados,' 1750, p. 230, likewise mentions this plant as a powerful anthelmintic, under the name of "Loggerhead weed." Fusée Aublet, 'Hist. des Plantes de la Guiane Française,' vol. i. p. 126, calls it, from Margraave and Plumier (1703), "Arapabaca," and gives the French name by which it is generally known through the French islands, "La Brinvilliers," after the infamous marquise de Brinvilliers, who, in conjunction with her lover St. Croix, poisoned so many people in France in the reign of Louis XIV. The 'Icones Plantarum Medicinalium,' Nuremburg, 1799, gives a plate of *Spigelia anthelmintica*, and Linnæus, 'Species Plantarum,' anno 1762, tom. i. p. 213, describes the plant; but no mention is made in either of these works of the Maryland species. Pereira, 'Elements of Materia Medica,' 1842, vol. ii. p. 1288, describes the *Spigelia anthelmintica* as possessing medicinal qualities similar to the Maryland species, quoting from Browne; and Nees ab Esenbeck, 'Handbuch der Medicinisch-pharmaceutischen Botanik,' 1831, vol. ii. p. 654, gives a long description of both species, giving however a preference to the Maryland species, "as being more used in North America."

I have been thus particular in giving an account of the history of our indigenous species in consequence of being desirous to show, that the vermifuge *Spigelia*, first brought to the notice of Europeans, was the one indigenous to the islands and continent of South America, and not the Maryland species, which became known afterwards, and has been since substituted for our species. The first mention of *Spigelia marilandica*, Pereira states, was in 1740, whilst the *Spigelia anthelmintica* was noticed by Plumier, 'Nova Plant. American.' gen. 11, in 1703, under the name of Arapabaca. The *Spigelia marilandica* is collected, according to Thompson, Pereira and others, by the Creek and Cherokee Indians, and sold to the American merchants. As it is scarcely used in England, a quantity only sufficient to supply the West Indies is imported, and that generally in a bad state. Pereira says, vol. ii. p. 1286, "Owing to the imperfect manner in which the plant is dried, it seldom happens that packages of it reach the market free from dirt and mouldiness."

The quantity of Maryland pink-root imported here may not amount to much; but it appears evident, if we can procure, in our immediate vicinity, without much labour, an article superior both in regard to freshness and activity, that it is worth while bringing it to the notice of poor people, who may turn a penny or two by collecting and drying the plant. To the medical men in the colony, who are in the habit of using a mouldy, uncertain remedy, sometimes in enormously bulky and disagreeable doses, as a *substitute* for the fresh plant within their immediate reach, it is a matter of some importance.

With regard to the great efficacy of the plant, the testimony of Browne, a learned physician and excellent botanist above quoted, and the experience of the common people (by no means a despicable criterion) ought to be relied on. The late Mr. J. D. Paterson of Christianburg, a gentleman of remarkable powers of observation and

strong intelligence, told me shortly before his death, that he was in the habit of administering the Demerara pink-root, in decoction, in the proportion of from two to three fresh leaves for a dose, and that the effect was much more certain and marked than that produced by the pink-root of the shops, in thirty or forty grain doses. I have likewise lately been informed of several cases in which the decoction of the fresh leaves of our species was efficacious when the Maryland pink-root failed.

I need not lengthen these few remarks, as my object is merely to suggest to medical practitioners the superiority of the fresh or recently dried *Spigelia anthelmia* to the broken and mouldy *Spigelia marilandica* brought into this colony from a great distance, and to introduce, however insignificant it may be, a new source of industry to the poor. The preparation of the plant for sale is very simple: it must be pulled up by the roots in a green state, and the seeds stripped off; it is then to be carefully cleaned, dried in the sun, and packed in bundles.

METEOROLOGICAL OBSERVATIONS FOR OCTOBER 1844.

Chiswick.—October 1. Clear: cloudy. 2. Densely clouded: clear. 3. Overcast: boisterous. 4. Clear and very fine: cloudy. 5. Very fine: rain. 6. Overcast: clear and fine: overcast. 7. Very fine: frosty. 8. Foggy: very fine. 9. Cloudy: boisterous at night. 10. Cloudy and mild: clear. 11. Heavy dew: very fine. 12. Foggy: very fine: showery. 13. Overcast: lightning at night. 14. Showery: rain. 15. Heavy shower: constant heavy rain at night. 16. Showery: clear and fine. 17, 18. Fine. 19. Slight haze: cloudy. 20. Fine. 21. Overcast: hazy. 22. Rain: cloudy: clear and frosty. 23. Dense fog: showery. 24. Cloudy: heavy rain. 25. Rain: densely clouded. 26, 27. Overcast and fine. 28. Foggy. 29. Overcast: rain. 30. Drizzly: cold haze. 31. Foggy: fine: clear.—Mean temperature of the month 0°·76 below the average.

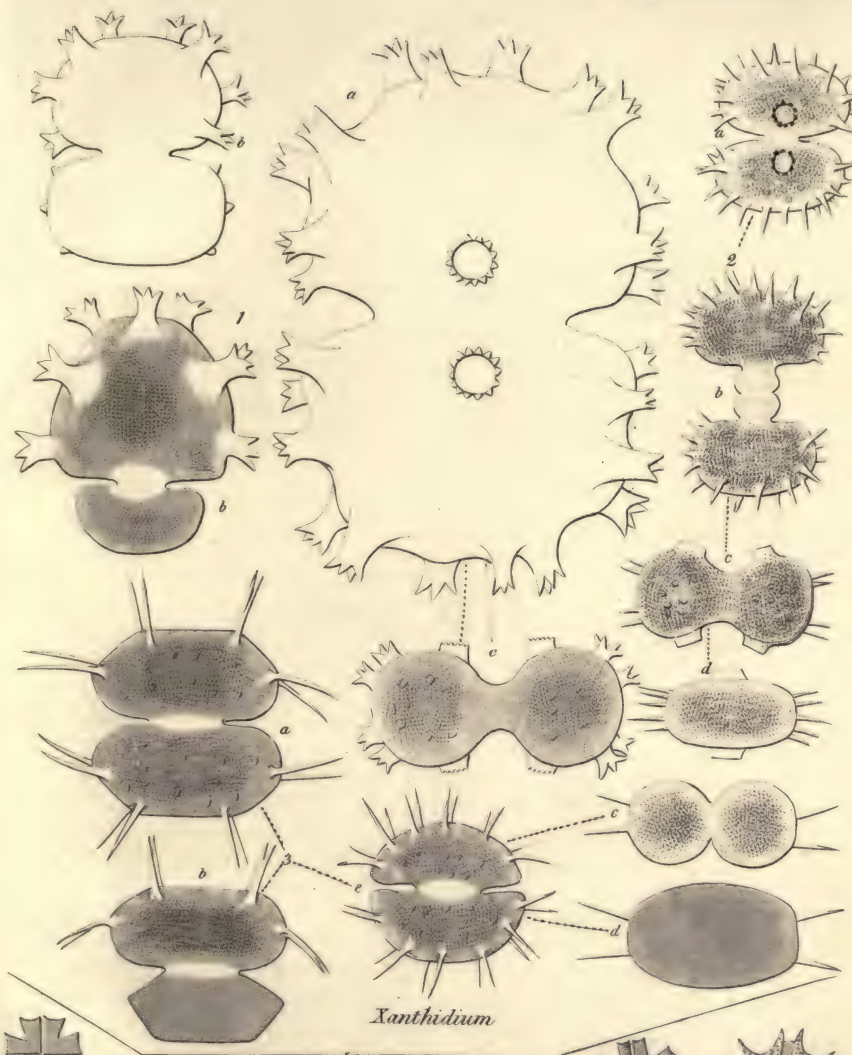
Boston.—Oct. 1. Fine. 2. Cloudy and stormy: rain early A.M.: rain A.M. 3. Windy. 4. Fine. 5. Cloudy: rain P.M. 6—8. Fine. 9. Cloudy: rain A.M. 10. Cloudy: rain P.M. 11, 12. Fine. 13, 14. Fine: rain P.M. 15. Cloudy: rain P.M. 16. Cloudy. 17. Cloudy: rain P.M. 18. Cloudy. 19. Fine. 20. Cloudy. 21. Cloudy: rain P.M. 22. Cloudy. 23. Foggy: beautiful halo round the moon quarter past eight P.M. 24, 25. Cloudy: rain P.M. 26. Rain. 27. Cloudy. 28. Fine: rain P.M. 29. Fine. 30. Cloudy: rain A.M. 31. Fine.

Sandwick Manse, Orkney.—Oct. 1—3. Showers. 4, 5. Bright: showers. 6. Shower: aurora: showers. 7. Bright: clear. 8. Cloudy: drops. 9. Cloudy. 10. Bright: cloudy. 11. Bright: clear. 12, 13. Bright: cloudy. 14. Drizzle. damp. 15. Rain: cloudy. 16. Rain: showers. 17. Shower: rain. 18. Showers: 19. Frost: cloudy: shower. 20. Clear: fine: aurora. 21. Frost: fine. 22. Clear. 23. Clear: cloudy. 24. Bright: clear. 25. Fine: clear: aurora. 26. Fine: clear. 27. Cloudy. 28. Cloudy: clear. 29. Bright: clear. 30, 31. Cloudy.

Applegarth Manse, Dumfries-shire.—Oct. 1. Fair. 2, 3. High wind and rain. 4. Rain P.M. 5. Fair, but cloudy. 6. Showers. 7. Fair and fine. 8. Fair, but dull. 9. High wind and rain. 10, 11. Showers. 12. Rain A.M. 13. Cloudy and threatening. 14. Showery. 15—17. Fair and fine. 18. Fair and fine: frost P.M. 19, 20. Showers: thunder: hail. 21. Fair and fine: frost. 22—24. Fair and fine. 25. Showery. 26. Fair and fine. 27, 28. Fair, but cloudy: frost. 29. Slight rain. 30. Rain P.M. 31. Fair, but cloudy.

Meteorological Observations made by Mr. Thompson *at the Garden of the Horticultural Society at* Chiswick, *near London; by* Mr. Veall, *at* Boston; *by the* Rev. W. Dunbar, *at Applegarth Manse,* Dumfries-shire; *and by the* Rev. C. Clouston, *at Sandwick Manse,* Orkney.

Days of Month.	Barometer.							Thermometer.							Wind.				Rain.			
	Chiswick.		Boston. 8¼ a.m.	Dumfries-shire.		Orkney, Sandwick.		Chiswick.		Boston. 8¼ a.m.	Dumfries-shire.		Orkney, Sandwick.		Chiswick. 1 p.m.	Boston.	Dumfries-shire.	Orkney, Sandwick.	Chiswick.	Boston.	Dumfries-shire.	Orkney, Sandwick.
1844. Oct.	Max.	Min.		9 a.m.	9 p.m.	9½ a.m.	8¼ p.m.	Max.	Min.		Max.	Min.	9¼ a.m.	8¼ p.m.								
1.	30·109	29·962	29·47	29·80	29·70	29·61	29·48	70	45	52	69	50	50	50½	sw.	sw.	sw.	w.	.....	.....	.....	·76
2.	29·795	29·561	29·03	29·21	29·55	28·97	29·37	70	47	56	59	48½	53	49	w.	w.	w.	wnw.	.....	·11	.....	·43
3.	29·830	29·758	29·15	29·39	29·57	29·18	29·33	71	41	57	60	51	52	47½	sw.	w.	wnw.	w.	.....	·02	.....	·56
☾ 4.	29·959	29·871	29·38	29·75	29·65	29·67	29·65	69	46	53	57	45½	48	46	sw.	w.	w.	w.	.....	.....	.....	·50
5.	29·802	29·686	29·18	29·52	29·63	29·59	29·58	67	39	57	55	45	46	44	sw.	sw.	w.	w.	·22	.....	.....	·11
6.	29·986	29·896	29·44	29·65	29·65	29·52	29·47	63	40	47	55	36	46½	45½	sw.	calm	wsw.	w.	.....	·10	.....	·31
7.	29·997	29·872	29·35	29·76	29·82	29·76	29·87	62	29	48·5	53	35½	45	39	nw.	w.	wnw.	nw.	.....	.....	0·72	·24
8.	29·946	29·568	29·46	29·68	29·35	29·59	29·46	61	41	42·5	51	32	47½	49	s.	calm	se.	s.	.....	.....	.....	.....
9.	29·291	29·025	28·84	29·04	28·85	29·27	29·23	63	53	49·5	53	46	51	50	se.	se.	ese.	se.	·01	.....	.....	·03
10.	29·440	29·194	28·74	28·91	29·15	29·01	29·13	63	35	56	58½	49	54	52	sw.	s.	ese.	se.	·07	·04	.....	.....
● 11.	29·741	29·623	29·11	29·48	29·50	29·28	29·42	68	39	50	54	49	52	51	sw.	w.	ssw.	sse.	.....	·02	.....	.....
12.	29·724	29·540	29·18	29·50	29·27	29·49	29·41	64	55	52	58	40½	51	51½	s.	calm	ssw.	s.	·03	.....	.....	.....
13.	29·409	29·217	28·90	29·13	29·00	29·27	29·26	65	45	58	60	53	54	52	sw.	calm	ssw.	se.	·33	.....	.....	.....
14.	29·322	28·987	28·80	28·97	28·89	29·17	29·12	65	44	52	56	48	52½	51	s.	sw.	e.	e.	·42	·02	1·40	.....
15.	29·018	28·940	28·70	28·81	28·80	29·05	28·86	63	46	53	55	44	49½	48½	sw.	w.	e.	ne.	1·04	·15	.....	·10
16.	29·096	28·940	28·52	28·90	29·00	28·87	29·14	60	43	45	57	41	49	47	w.	calm	sw.	n.	·02	·06	.....	·72
17.	29·450	29·232	28·74	29·14	29·31	29·28	29·44	59	37	48	53	43½	47	45	w.	calm	sw.	n.	.....	.....	.....	·38
☽ 18.	29·779	29·618	29·15	29·53	29·61	29·61	29·65	56	33	48·5	51	42	42	38	w.	w.	nw.	n.	.....	·02	.....	·33
19.	29·782	29·577	29·27	29·40	29·22	29·35	29·16	58	42	39	51	30	41½	43	sw.	calm	sw.	s.	·03	.....	.....	·05
20.	29·460	29·416	28·96	29·10	29·19	29·15	29·29	59	34	46	51	39	43	39	sw.	w.	sw.	sse.	·03	.....	.....	.....
21.	29·601	29·510	29·14	29·42	29·66	29·58	29·79	59	43	44	52½	38½	40	41	e.	calm	ne.	nw.	·64	.....	.....	.....
22.	29·897	29·766	29·27	29·75	29·77	29·83	29·72	59	30	49	52	34	40½	42	w.	calm	ne.	s.	·04	·68	0·20	.....
23.	29·912	29·771	29·50	29·74	29·80	29·72	29·72	58	39	37·5	51	30½	47	47	n.	calm	se.	se.	·04	.....	.....	.....
24.	29·706	29·671	29·38	29·74	29·90	29·74	29·92	52	46	48	48	29	46½	42	n.	calm	se.	sse.	·88	.....	.....	.....
25.	29·853	29·760	29·40	29·88	30·14	30·07	30·12	52	40	49	50	39½	42	40	n.	calm	sw.	n.	·03	·59	.....	.....
○ 26.	30·096	29·917	29·43	30·00	30·22	30·23	30·30	53	37	52	53½	43	43	40	n.	calm	ne.	ne.	.....	·31	.....	.....
27.	30·252	30·237	29·79	30·24	30·09	30·38	30·40	53	29	48·5	48½	35	44½	44½	ne.	calm	ne.	e.	.....	·10	.....	.....
28.	30·209	30·129	29·79	30·18	29·88	30·38	30·33	47	31	41·5	51	35	45½	40½	ne.	calm	ne.	e.	.....	.....	.....	.....
29.	30·053	29·912	29·68	30·03	29·72	30·26	30·13	52	42	48	51	43	46	43½	e.	calm	e.	ese.	·28	·05	0·15	.....
30.	29·818	29·808	29·46	29·73	29·72	30·00	29·94	48	34	48	49	45	45½	47½	e.	calm	e.	ese.	·02	.....	.....	.....
31.	29·812	29·687	29·45	29·75	29·63	29·94	29·89	54	43	48	51	44½	48½	48	e.	se.	ese.	se.	.....	·10	.....	.....
Mean.	29·766	29·601	29·21	29·520	29·491	29·574	29·599	60·09	40·26	49·1	54·0	41·4	47·20	45·62					4·13	2·37	2·47	4·52



Ralfs del.

J.D.C. Sowerby fe.

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LV.—*On the British* Desmidieæ. By John Ralfs, Esq., M.R.C.S., Penzance*.

[With a Plate.]

Xanthidium, *Ehr.*

Fronds simple, constricted in the middle; segments slightly compressed, turgid and entire, having their surfaces more or less furnished with simple or branched spines.

In this genus the fronds are deeply constricted in the middle; their segments are slightly compressed, turgid, reniform or orbicular, and entire, rarely somewhat angular, and they are furnished with elongated spines which are simple or branched, and either scattered over the surface or confined to the margin, when they are apparently placed in two rows, one on each side of the marginal line.

Xanthidium requires to be distinguished from two genera only, namely *Staurastrum* and *Cosmarium*; its resemblance to the former is more apparent than real, and will probably mislead no one who has examined a plant belonging to that genus. In *Staurastrum* the processes are elongations of the angles, and in an end view always marginal; whereas in *Xanthidium* the spines are situated on the convex surface, are arranged in transverse series, and consequently in an end view run in lines across the centre. The connexion with *Cosmarium* is far more intimate, and in fact the sole distinctive character that can be relied upon is the presence of elongated spines in this genus. Meneghini indeed still more reduces the number and value of the differential marks by retaining in *Xanthidium* only those species whose spines are scattered over the surface, whilst he refers to *Cosmarium* those in which the spines are confined to the margin; I think however that his views cannot be admitted, and that we must either retain the genus as formed by Ehrenberg or unite all the species with *Cosmarium*, for in *Xanthidium furcatum* the principal spines are marginal, and many specimens, especially in a young state, have none other.

In two species a remarkable projection on the centre of each

* Read before the Botanical Society of Edinburgh, June 13, 1844.

segment has been noticed. If, as is not unlikely, these projections should be discovered to exist in all the true species of this genus, it will be more decidedly separated from *Cosmarium* than at present, when, it must be confessed, the diagnostic marks between these genera are not so strong and satisfactory as could be wished. These central projections were first pointed out to me by Mr. Dalrymple in *Xanthidium furcatum*, under which species a more detailed description will be found.

I have little doubt that there are more British species of *Xanthidium* than I shall describe here, and, indeed, believe that I have more than once gathered *X. hirsutum*; but as my attention was not particularly directed to the *Desmidieæ* at the time, I neglected to examine it with sufficient care to be able to state my observations with any confidence in this paper*.

1. *X. furcatum*, Ehr. Spines marginal and scattered, stout, terminated by three or more acute, diverging points. Ehr. Infus. p. 146. tab. 10. fig. 25; Pritch. Infus. p. 188. fig. 110; Menegh. Synop. Desmid. p. 224. *Xanthidium*, no. 2, Bailey, *l. c.* p. 291. pl. 1. fig. 15.

In boggy pools. Weston Bogs near Southampton, Piltdown Common near Uckfield, Rackham Common near Pulborough, and Ashdown Forest, Sussex; near Tunbridge Wells, *Mr. Jenner*; Dolgelley and near Carmarthen.

This species forms cloud-like masses at the bottom of shallow pools, and on being detached immediately rises to the surface. Its fronds are visible to the naked eye, being dispersed, like minute glittering dots, through the cloud-like substance which connects them.

The fronds are deeply constricted; their segments reniform or suborbicular; in the newly formed segment the spines are either wholly wanting or only minute conical projections, which first elongate and finally form stout spines more or less divided at the apex into diverging points. At first the spines are confined to the margin, but as the plant approaches maturity they are sparingly scattered over the surface.

Plate XII. fig. 1. *Xanthidium furcatum*: *b*, with newly-formed segment; *c*, lateral view.

2. *X. fasciculatum*, Ehr. Spines simple, acute, few, always in pairs and confined to the margin. Ehr. Infus. p. 146. tab. 10. fig. 24 *a*;

* In Bailey's 'American Bacillaria,' "*Euastrum*, no. 11," pl. 1. fig. 13. represents a species of *Xanthidium* with six pair of marginal spines on each segment, and apparently the central projections described above. The occurrence of these projections on this plant is interesting both because it supplies another example, and also because their presence in a species with marginal spines only is another argument against the separation of the species with marginal spines from those in which they are scattered.

Pritch. Infus. p. 187. *Cosmarium aculeatum*, Menegh. *l. c.* p. 218. *Euastrum*, no. 10, Bailey, Amer. Bacil. p. 296. pl. 1. fig. 10.

β. *polygonum*, Ehr. Infus. tab. 10. fig. 24 *b*.

In peat bogs near Dolgelley, *J. R.*; near Tunbridge Wells, *Mr. Jenner*.

Fronds deeply constricted; segments transversely elliptic or reniform. In *a*. each segment has four angles and eight spines in four pairs. The pair situated at each side angle converges with the similar one of the other segment, but those placed at the angles at the end generally diverge from each other. In each pair the spines usually have the same direction, and hence it appears single until carefully examined.

The variety β. is a smaller plant, scarcely angular, and its spines are more numerous, but are also in pairs and confined to the margin. This state much resembles *Xanthidium aculeatum*, but in that species the spines are not in pairs, and are more or less scattered.

In both varieties, though the spines seem to be in pairs and to arise from the same point, they really arise on opposite sides of the marginal line, as may be ascertained by an end view.

I regret that I omitted to observe whether this species has any projecting process on its surface, such as I have noticed in *X. furcatum* and *aculeatum*.

Endochrome dark green, with large scattered starch granules.

Plate XII. fig. 3. *X. fasciculatum*: *b*, with newly-formed segment; *c*, lateral view; *d*, end view; *e*, β. *polygonum*.

3. *X. aculeatum*, Ehr. Spines simple, marginal and scattered. Ehr. Infus. p. 147. tab. 10. fig. 23; Pritch. Infus. p. 187. fig. 109; Menegh. *l. c.* p. 224.

Weston Bogs near Southampton, and near Tunbridge Wells, *Mr. Jenner*; Penzance.

Fronds deeply constricted, so as to form a linear notch on each side. The spines are simple and acute; most of them are marginal, but somewhat scattered.

In the centre of each segment, on both surfaces, is a projection similar to that described under *X. furcatum*, but less evidently dentated.

Xanthidium aculeatum has a considerable resemblance to the variety *polygonum* of the preceding species, but the spines are not in pairs, and, although sometimes confined to the margin, are irregular and not in a single line on each side of it.

Plate XII. fig. 2. *X. aculeatum*: *b*, with newly-formed segment; *c*, lateral view; *d*, end view.

Pediastrum, *Meyen* (Micrasterias, *Ehr.*).

Fronds plane, circular, composed of several cells, which form by their union a flattened star, and are generally arranged either in a single circle or in two or more concentric ones; marginal cells bipartite.

Fronds minute, composed of four or more cells united together into the figure of a flattened star; when only four in number they are not arranged in a circle, and the star is somewhat angular; in most species however they form either a single circle or two or more concentric ones, and one or two of them usually occupy the centre. The cells are thus combined by a mucous matrix which is generally colourless, and constitutes hyaline interstices. Occasionally some are ruptured, but their endochrome alone escapes, and the others are not affected. In all the species the outer cells have the free margin bipartite, a character which I consider important, and in fact a modification of the form observed in *Cosmarium* and other genera with constricted fronds. The cell in *Pediastrum* is different, since its division into two segments exists only on one side, and in the inner cells is nothing more than a slight concavity of the external margin. The occurrence of this division on one side only of the outer cells, whilst in the inner ones it becomes obsolete, is an additional reason for considering the frond in the preceding genera to be really a single cell, which constricted in the middle forms two segments, and not the result of the union of two cells.

The flat, starlike fronds of *Pediastrum* are so characteristic, that there is no risk of mistaking it for any other genus, *Crucigenia* perhaps excepted; that however differs by having entire quadrangular cells.

It is far more difficult to distinguish its species; Ehrenberg relies chiefly on the number of the circles, but this character, as Meneghini and Professor Bailey have observed, cannot always be depended on; the latter says, "There appears to me to be much confusion in the specific characters, arising from the circumstance, that the *number* of corpuscles in the different rows has been made a character of specific importance. From what I have seen of the species, I am satisfied that the number of corpuscles in a star is liable to great variation in the same species."

I have myself noticed that, in one species (*P. Boryanum*) at least, the number of circles varies from one to three, and the same observation has been made by Mr. Jenner. He has also remarked that the number of cells in the inner circle, on which I was inclined to place greater reliance, is subject to variation. Some species have one cell in the centre, and others two; these I have found constant, but they are said to be sometimes deficient.

All the above characters, it must be allowed, are more or less uncertain; still upon them we must for the most part depend in discriminating between nearly allied species.

Meneghini adopts as a specific character the number and position of hyaline vesicles in each cell; I regret that I have not paid sufficient attention to this point to enable me to determine its value.

Professor Bailey suggests that the form of the cells may be a more certain character, but I believe that in this respect also they are variable; for even in the same species the segments of the marginal cells are in some specimens much elongated, and in others very short.

The segments are in some species more or less emarginate, and in others entire; as this character appears to be constant, I have taken advantage of it to divide the genus into two sections.

Under *Micrasterias* I have stated my reasons for agreeing with Meneghini and retaining Meyen's name for this genus, which Ehrenberg has supposed to be the *Micrasterias* of Agardh.

* *Segments of the outer cells emarginate.*

1. *P. Tetras.* Cells four, separated by colourless interstices which form a cross; segments truncato-emarginate. *Micrasterias Tetras*, Ehr. Infus. p. 155. tab. 11. fig. 4; Pritch. Infus. p. 192.

In boggy pools: rare. Barmouth and Penzance, *J. R.*; Beckley Furnace near Battle, Sussex, *Mr. Jenner*.

Fronds extremely minute, composed of four cells, which form a star-like figure; the cells are somewhat triangular, and connected together by a hyaline matrix which forms colourless interstices in the figure of a cross; the free margin is bipartite; the segments terminated by a broad, shallow notch with acute corners. The colouring matter is pale green.

Meneghini gives this species as a synonym of *Pediastrum heptactis*, but I cannot suppose it to be the young of that plant. At Penzance I have never gathered the *P. heptactis*, and at Barmouth, where I found them intermixed, I have not seen any intermediate forms.

Plate XII. fig. 4. *P. Tetras.*

2. *P. heptactis*, Mgh. Frond constituted of seven cells disposed in a circle and one in the centre; segments of the cells emarginate. Menegh. *l. c.* p. 211. *Micrasterias heptactis*, Ehr. Infus. p. 156. tab. 11. fig. 4; Pritch. Infus. p. 193. fig. 114. *Micrasterias renicarpa*, Kutz. Syn. Diatom. in Linnæa 1833, p. 603.

In boggy pools: very rare. Barmouth, *J. R.*; Sussex, *Mr. Jenner*.

Fronds very minute, composed of eight cells, one in the centre and seven in a circle round it; the cells are connected together

by a gelatinous matrix, which forms colourless interstices. The seven external cells are bipartite, and their segments terminate by a broad, shallow notch with acute corners; in other respects the cells are variable; the figure of the central one especially differs in almost every specimen, being sometimes angular and entire, and sometimes deeply divided with rounded segments.

The colouring matter is very pale. Meneghini describes a solitary hyaline vesicle at the base of each cell.

Plate XII. fig. 5. *P. heptactis.*

** *Marginal cells bipartite, their segments entire, and either acute or elongated.*

3. *P. Napoleonis*, Mgh. Six bipartite cells in a circle, and two angular ones in its centre. Menegh. *l. c.* p. 212. *Micrasterias Napoleonis*, Kutz. *l. c.* p. 602; Ehr. Infus. p. 156. *Helierella Napoleonis*, Turp. (1820).

In freshwater pools: rare. Dolgelley.

Fronds minute, with two angular cells in the centre, and six bipartite ones arranged in a circle round them. The form of the external cells varies, as in most of the species of this genus; they are generally somewhat crescent-shaped with elongated and acute rays; the colour of the interstices is mostly pale green; the endochrome in the cells is minutely dotted. According to Meneghini, hyaline vesicles, if present, are solitary in each cell.

This species may be distinguished from all states of the following one by having two cells in the centre and six in the circle.

Plate XII. fig. 6. *P. Napoleonis.*

4. *P. Boryanum*, Mgh. Central cell solitary, surrounded by one circle of five cells, and generally by a second of ten cells; occasionally by a third and even by a fourth circle. Menegh. *l. c.* p. 210. *Micrasterias Boryi*, Ktz. *l. c.* p. 603. *Micrasterias Boryana*, Ehr. Infus. p. 157. tab. 11. fig. 5; Pritch. Infus. p. 193. fig. 5; Bailey, Amer. Bacil. fig. 20. *Micras. tricyclia*, Ehr. Infus. p. 158. tab. 11. fig. 8. *Helierella Boryana*, Turp. (1820).

In freshwater pools, &c., not uncommon. Cheshunt, Herts, *Mr. Hassall*; Weston Bogs near Southampton; Dorking, Surrey; Storrington Common, Brambletye near East Grimstead, and Tunbridge Wells, Sussex, *Mr. Jenner*; Dolgelley, Barmouth, and Penzance.

This species, which is by far the most common, is a very variable plant. There is always a single cell in the centre, which may be surrounded by one, two, three or more circles. In the most common form there are two circles, and in their common centre a single cell which is pentagonal and has one face slightly concave; the inner circle consists of five hexagonal cells slightly concave on the outer face; the second or outer circle consists of

ten cells, which are placed alternately opposite to the concave faces of the inner cells and the junction of their sides; in the former case they have three, and in the latter four faces besides the external margin.

When there is a third circle it generally consists of fifteen cells. In all the varieties the cells of the external circle are notched, and their segments more or less prolonged; but the length and form of the rays are very variable.

Meneghini describes several diaphanous vesicles in each cell.

Sometimes plants are met with having more than three circles; these are probably the *Micrasterias elliptica*, Ehr. Infus. p. 158. tab. 11. fig. 9, which Meneghini refers to the present species. I am not however satisfied that it is not distinct; the external cells agree with the description given above, but the inner ones are variable in number and not arranged in regular circles. Whether it possesses any other distinctive character I have not yet clearly ascertained. This form is fig. 21 of the 'American Bacillaria.'

Plate XII. fig. 7. *P. Boryanum*: *a*, central cell; *b*, a cell of the inner circle; *c*, marginal cells.

Plate XII. fig. 8. *P. Boryanum*, var.: *a*, central cell; *b*, marginal cells.

LVI.—*Catalogue of Irish Entozoa, with observations.* By O'Bryen Bellingham, M.D., Fellow of and Professor of Botany to the Royal College of Surgeons in Ireland, Member of the Royal Zoological, Geological and Natural History Societies of Dublin, &c*.

One of the objects contemplated by the Natural History Society of Dublin on its formation, was to obtain, at as early a period as circumstances permitted, a complete catalogue of the animals, vertebral as well as invertebral, which are natives of this country. With the wish to contribute as far as lies in my power to so desirable an object, I have brought forward the following catalogue of Entozoa, or parasitic animals (a part of the invertebral kingdom which has not hitherto enjoyed much of the attention of British zoologists), which I have met with in this country, the great majority of them being new to the British fauna; in order to render it so far a perfect list of our indigenous species, I have included a few which I have not been so fortunate as to find myself, but which have been noticed or described by others, particularly by Dr. Drummond, the President of the Belfast Natural History Society, whose talents have already contributed to ad-

* In order to complete Dr. Bellingham's Catalogue of Irish Entozoa, and to include all the species known in our volume for the current year, we have reprinted the first portion (containing the genera *Filaria*, *Trichosoma*, *Trichocephalus*, *Oxyuris*, and *Cuculanus*,) which was originally published in Charlesworth's Magazine of Natural History.—Ed.

vance more than one branch of natural history, and who has lately turned his attention to these much-neglected animals, and has described some species altogether new to science.

Under the general name Entozoa (derived from *ἐντὸς, intus, ζῶον, animal*) are included all the animals which naturally and permanently reside in the alimentary canal, or some other part of the interior of animals. And although the habitat of any animal is not a sufficient ground to separate it from the genera or species which approach it in organization, yet as the Entozoa have been studied and described as a separate group by those naturalists whose authority upon the subject is the highest; and as the majority of them are distinct in organization from any animals not parasitic; and as we are as yet far from having arrived at a natural arrangement of invertebral animals (there being some groups which, though not parasitic, require to be associated with the Entozoa, and others which are parasitic, and which many have arranged with these animals, but of which the true situation is extremely doubtful);—it appeared to me to be more prudent to retain the term in the sense used by Rudolphi and Bremser; and on the present occasion I shall confine myself altogether to the true Entozoa, or those species which inhabit some part of the interior of the bodies of other animals; and I shall not enter at all upon the disputed point, as to the place which these animals ought to occupy in a natural arrangement of the invertebral kingdom.

The animals included under the term Entozoa, although they have been very carefully studied by several continental zoologists, and have occupied a considerable share of the attention of several distinguished comparative anatomists, have from some cause or other been little attended to, I might almost say completely overlooked by British naturalists, even by men distinguished in other departments of the science. "While there are some branches of natural history (as Mr. Jenyns has observed in his 'Report on Zoology') which are most sedulously cultivated by us, there are others which have for a long time lain comparatively neglected." This remark is peculiarly appropriate, and applies particularly to the animals which form the subject of the present communication; they are commonly looked upon with disgust instead of anything of interest in a scientific point of view, and the number of individuals who have made them a study is exceedingly limited. Indeed, the little attention which the Entozoa have attracted in these countries will be apparent from the fact, that in the only works which contain lists of the British species, viz. Pennant's 'Zoology' and Turton's 'British Fauna,' but twenty-eight species are described as indigenous; and four of these are repeated twice under different names, leaving but twenty-four distinct species:

while in the limited opportunities which I have had, I have detected and preserved upwards of 200 species, and several of these occurred in six, others in ten, and one species in as many as fifteen different animals.

The Entozoa, although they do not form a very numerous division of the animal kingdom, are very extensively distributed, as in almost all the mammalia, birds, reptiles and fish which I have examined, I have detected some species, and often more than one; and there is scarcely a tissue or organ in which they do not sometimes occur.

I have found them in the œsophagus, stomach and intestines, in the bronchial tubes and air-cells of the lungs of some animals; in the urinary bladder, in the gall and swim-bladder of others; in cellular tissue and in serous membranes; in the substance of the heart, in the liver and kidney; some species inhabit the brain of animals, others their eyes, others aneurismal swellings of arteries, others the *meatus auditorius*, the frontal and maxillary sinuses, and even the cavity of the *tympanum*. In fact there is hardly an organ in which some species has not been detected, at least among vertebral animals; and if they are more rare among the Invertebrata, it is, perhaps, because we have not yet sufficiently sought for them.

The number of animals which I have dissected in order to complete this list is very considerable; I possess notes of having examined upwards of 270 mammalia, 360 birds and 380 fish, exclusive of reptiles which are indigenous to this country. And here I have much pleasure in acknowledging the assistance which I have received from Mr. Richard Glennon, preserver of animals to the Natural History Society, who most obligingly placed at my disposal the body of any animal sent to him to be preserved which I was desirous of examining; indeed, without his kind co-operation, I could not have brought this list to its present extent.

The classification to which I have adhered in the following catalogue is the one given by Rudolphi in his 'Synopsis,' followed by Bremser in both his works, and adopted by almost all zoologists since. I cannot see the necessity for the change in the nomenclature of the orders which has been made by Mr. Owen, in his article Entozoa in the 'Cyclopædia of Anatomy and Physiology.' Rudolphi's terms are in a great measure established, having been adopted by almost every writer upon the subject since his time; and if the names of families or orders are to be altered upon trivial grounds, we should be under the necessity of giving up many of the names which have been longest established; indeed nothing appears to have a greater tendency to retard the study of natural history than the unnecessary multiplication of

names which are already too numerous. But in the present instance I do not think the new names are an improvement upon the old; the latter appear to me to be more expressive, and their having been adopted by the best practical helminthologists is a sufficient reason for retaining them here.

Rudolphi has arranged the Entozoa in five orders of families, each of which includes a larger or smaller number of genera. On the present occasion I shall only notice those genera in which I have as yet detected species inhabiting animals natives of this country.

Commencing with those most highly organized, they are *Nematoidea, Acanthocephala, Trematoda, Cestoidea,* and *Cystica.*

Order 1. NEMATOIDEA.

(Derived from *νῆμα, filum,* and *εἶδος, forma.*)

The order *Nematoidea* includes the Entozoa whose organization is the highest; the body is cylindrical and elastic, more or less attenuated at each extremity; intestinal canal complete, provided with a mouth and anus; sexes distinct; commonly oviparous, rarely viviparous. The head is continuous with the body, very rarely separated by a neck, often obtuse and sometimes edged by lateral membranes (what Rudolphi has called winged). The posterior extremity of the body is either sharp or obtuse, often curved. The male is almost always smaller than the female, and the *penis,* which is either a single or double *spiculum,* frequently projects externally. In both sexes the internal organs of generation (the ovaries in the female and the seminal tubes in the male) are in the form of long filaments, which surround the intestinal canal. The generic characters are taken principally from the shape of the mouth, or from the disposition of the tubercles which surround it, the absence or presence of lips, &c.

The genera in this order are found in all classes of animals; they inhabit almost every organ, but most frequently the alimentary canal.

Genus 1. Filaria.

(Derived from *filum,* a thread.)

Body long, cylindrical and elastic, nearly of equal diameter throughout; mouth orbicular. Male organ a simple *spiculum.*

This genus was established by Müller, and has been adopted by Rudolphi; the species inhabit cellular membrane in every part of the body, very rarely the alimentary canal; they are not uncommon in mammalia, birds and fish, they are less common in reptiles; they occur also in invertebral animals, particularly in the larva of Lepidoptera, and in some Coleoptera.

The *Filaria* have been arranged by Rudolphi in two sudivisions, according as the mouth is simple or papillary and labiate.

Ore simplici.

1. *Filaria attenuata.* { Cellular membrane in abdomen of peregrine falcon (*Falco peregrinus*).

Species dubiæ.

2. *Filaria* *. Peritoneum of red gurnard (*Trigla Pini*).
3. ———†. Peritoneum of mullet (*Mugil Capito*).
4. ———? ‡ Abdominal cavity of bee (*Bombus terrestris*).

Genus 2. Trichosoma.

(Derived from θρὶξ, *capillus*.)

Body cylindrical and elastic, of moderate length, very slender towards the anterior extremity, and insensibly enlarging posteriorly. Mouth terminal, punctiform. Male organ a simple filament contained in a sheath.

This genus was established by Zeder, under the name of *Capillaria*. The species are most common in birds, next in the mammalia; they are very rare in reptiles and fish; they inhabit the stomach, the small and large intestines, sometimes the urinary

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* This species of *Filaria* (which does not appear to have been described) occurred under the peritoneum of the common red gurnard (*Trigla Pini*). The specimens which I possess are from three to four inches in length, and about the thickness of strong thread; the colour white, body cylindrical, and of the same diameter throughout. Anterior extremity obtuse and rounded, posterior acute. Mouth orbicular and very small. In removing them, some ruptured, and allowed the ovaries and intestinal canal to protrude.

† This species (which also appears not to have been described) occurred in the peritoneum of the common gray mullet (*Mugil Capito*); they were so imbedded in this membrane that it required considerable trouble to remove them, and some portion of the membrane continued to adhere to them, which rendered their examination difficult; they are about $4\frac{1}{2}$ lines in length, colour white, body slender, and of the same diameter throughout. Anterior and posterior extremity rounded, mouth obscurely orbicular; a slight prominence near the posterior extremity, at which the anus appeared to open.

‡ This species I have met with upon several occasions in the cavity of the abdomen of the common humble bee (*Bombus terrestris*), and sometimes in very large numbers; they lived and moved about in a watch-glass containing water for a considerable time; they are cylindrical, some are smaller than others, and in these the posterior extremity is very slightly curved, in the larger (which probably are females) this part is straight. They are so small as to be hardly visible without a lens, and in consequence of this I have not been able to succeed in seeing the shape of the mouth; hence they may probably eventually turn out to belong to some other genus.

bladder. The species of the genus *Trichosoma* are all exceedingly small and resemble each other very closely (almost the only difference being a little greater or less length or thickness of the body), and as male and female are not always found together, it is very difficult to determine the species accurately; in fact, of the twenty-two species which Rudolphi has enumerated, sixteen are doubtful; and of thirteen species which I have met with nine are doubtful.

1. *Trichosoma obtusum* ? Cæca of horned owl (*Otus vulgaris*).
2. ——— *inflexum* ? . Small intestine of missel thrush (*Turdus viscivorus*.
3. ——— *longicolle* ? Small intestine of domestic fowl (*Gallus domesticus*).
4. ——— *plica* .... Urinary bladder of dog (*Canis familiaris*). Urinary bladder of fox (*Canis Vulpes*).

Species dubiæ.

5. *Trichosoma* ..... Urinary bladder of wild cat (*Felis Catus*).
6. ——— ..... Small intestines of weasel (*Mustela vulgaris*).
7. ———* ..... Urinary bladder of rat (*Mus decumanus*).
8. ——— ..... Small intestine of rat (*Mus decumanus*).
9. ——— ..... Stomach of hedge-hog (*Erinaceus vulgaris*).

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* This species of *Trichosoma* I have very frequently found in the urinary bladder of the common Norway rat; in some cases only one or two occurred, in others six, eight or upwards. Many were free in the bladder; others so firmly attached by their anterior extremity to the mucous membrane, that they broke across when pulled; and some even remained adherent after having been placed in spirits of wine. They are the largest species of *Trichosoma* which I have seen, the posterior division of the body in some being so thick as in a certain degree to resemble this part in the *Trichocephalus*, from which, however, they are readily distinguished, the increase in diameter being gradual, and not sudden. They are about 8 lines in length, the body white and cylindrical, the posterior extremity rounded; in the thicker part of the body the alimentary canal appears to be somewhat spiral, and is surrounded by the convoluted ovaries. All the specimens which I have appear to be females.

This species has not, I believe, hitherto been described, although it is very common, and I have frequently met with it. It occurs in the urinary bladder, both of the male and female rat, and is quite distinct from the species which inhabits the small intestine of the same animal.

From the thickness of the posterior part of the body compared with other species of *Trichosoma*, I would venture to suggest for this species the name *Trichosoma crassicauda*.

10. *Trichosoma* ..... { Small intestine of horned owl (*Otus vulgaris*).
11. ——— ..... Small intestine of pigeon (*Columba Livia*).
12. ——— ..... { Cæca and rectum of jackdaw (*Corvus Monedula*).
13. ———* ..... Intestines of hake (*Merluccius vulgaris*).

Genus 3. Trichocephalus.

(Derived from *θρὶξ, capillus,* and *κεφαλὴ, caput.*)

Body cylindrical and elastic, anterior portion capillary and suddenly passing into the thicker or posterior part (by this it is distinguished from the genus *Trichosoma,* in which the increase is very gradual); mouth orbicular; *penis* simple, contained in a sheath.

The name *Trichocephalus* was given to this genus by Goetze, and adopted by Rudolphi. It was formerly named *Trichurus* (from *θρὶξ, capillus,* and *οὐρὰ, cauda*), from the erroneous supposition that the capillary portion was the tail. The species inhabit the large intestines, particularly the cæcum of the mammalia; they do not occur in either birds or fish. The genus is not numerous in species. Rudolphi has arranged them in two subdivisions; our native species belong only to one of these subdivisions.

1. *Trichocephalus dispar*† .... Large intestines of man (*Homo*).

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* The genus *Trichosoma* is very rare in fish; Rudolphi or Bremser has never found them; the only species which has been as yet described to occur in these animals, is one noticed by Creplin in his 'Observationes de Entozois.' This species I found in the intestines of the hake (*Merluccius vulgaris*); the longest specimen is upwards of an inch in length, the body slender, colour perfectly white. As there cannot be a doubt that it is a new species, I would venture to suggest the name *Trichosoma gracilis* for it.

† The *Trichocephalus dispar* has been longer known than any other species of the genus; and although stated by several writers to be rare in these countries, in the course of my experience I have found it by far the most common species inhabiting the alimentary canal of the human subject. I have examined the intestinal canal of ninety individuals, who died in St. Vincent's Hospital, Dublin, of various diseases, and whose ages varied from three years to seventy; and in eighty-one out of the ninety, I found a larger or smaller number of this species; sometimes only one or two existed, sometimes they were in considerable abundance; the largest number I have met with in the same individual was 119; sometimes they were attached to the mucous membrane, more commonly they were free; they almost always inhabited the large intestine, particularly the cæcum; I have, however, met with them in the small intestine. The male appears to be as common, or perhaps more common than the female, which is contrary to what happens in most other genera of *Nematoidea.*

2. *Trichocephalus crenatus* * .. Cæcum of pig (*Sus Scrofa*).
3. ——————— *nodosus* .... Cæcum of mouse (*Mus Musculus*).

Genus 4. Oxyurus.

(Derived from *ὀξὺς, acutus,* and *οὐρὰ, cauda.*)

Body cylindrical and elastic, the posterior extremity subulate in the female; mouth orbicular and terminal; male organ contained in a sheath.

The genus *Oxyurus* was established by Rudolphi; it contains a very small number of species, only three being enumerated by Rudolphi in his 'Synopsis.' The species inhabit the large intestines of the mammalia, and have not been found in either birds, reptiles or fish.

1. *Oxyurus curvula* † ..... { Large intestine of horse (*Equus Caballus*).
2. ——— *ambigua* ‡ ..... Cæcum of rabbit (*Lepus Cuniculus*).

Genus 5. Cucullanus.

(Derived from *cucullus,* a hood.)

Body cylindrical and elastic, obtuse anteriorly, more attenuated posteriorly; mouth orbicular; head provided with a striated *cucullus* (from which circumstance the genus has been named); *anus* terminal; orifice of female organs a little behind the centre of the body; male organ a double *spiculum*; all the species viviparous.

The name *Cucullus* was given to this genus by Müller; the species inhabit the alimentary canal of fish, and do not occur in either mammalia or birds.

1. *Cucullanus elegans* § .. { Stomach, intestines and pyloric appendages of perch (*Perca fluviatilis*). Intestines of eel (*Anguilla acutirostris*).

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* This species resembles pretty closely the *Trichocephalus dispar*; the capillary portion of the animal is, however, a little longer, and the sheath of the penis has a somewhat different shape from what it has in that species.

† The *Oxyurus curvula* is noticed in Pennant's 'British Zoology' under the name of *Trichocephalus Equi*; it is the largest species of the genus, inhabiting the great intestine of the horse, and is not at all uncommon.

‡ I have found the *Oxyurus ambigua* in great numbers in the cæcum of the common wild rabbit; the females are double the length of the males, and much more numerous. The mouth is orbicular and very small; on each side of the head is a transparent membrane, somewhat resembling that of the *Ascaris vermicularis.*

§ The *Cucullanus elegans* is very common in the perch, occurring

2. *Cucullanus foveolatus**. { Intestines of plaice (*Patessa vulgaris*). / Intestines of dab (*Platessa Limanda*).

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in the stomach, intestines and pyloric appendages. The species is viviparous, as when some of the females have been accidentally cut across, I have seen the young come out in great numbers, and move about freely in water placed in a watch-glass.

The *Cucullanus elegans* is more rarely met with in the eel than in the perch; sometimes they were free in the intestinal canal, at others attached to the mucous membrane almost as firmly as *Echinorhynchi*. They were of a reddish colour, the head a deeper red than the body; after remaining in water for some time, every part became white except the head.

The female *Cucullanus elegans* from the eel is about $4\frac{1}{2}$ lines in length, the male about 2 lines. The head is rounded, and is pretty accurately represented in the magnified figure in Bremser's large work. The striæ upon the *cucullus* are numerous and run longitudinally; the mouth is orbicular, in some a small papilla projected; the œsophagus is narrow at its commencement, and runs in a straight line to the stomach, which is somewhat oblong and double the diameter of the œsophagus; the intestine is straight, the anus is situated near the posterior extremity. The *vulva* in the female is conspicuous, projecting, seated nearer the caudal than the anterior extremity of the body; the penis of the male (in the specimens which I met with) did not project externally. In the female the caudal extremity is rather sharp, not obtuse as Rudolphi describes it to be; it is straight in the female, inflexed in the male.

* The *Cucullanus foveolatus* from the plaice, in some instances, adhered firmly to the mucous membrane of the intestine; very soon after being placed in water, the integuments ruptured and allowed the ovaries, &c. to protrude. I have not observed that this species is viviparous.

The *Cucullanus foveolatus* from the dab is perfectly white, of equal diameter throughout, except at the extremities. The females are from 6 to $6\frac{1}{2}$ lines in length, the males rather less; the anterior extremity is obtuse, the posterior acute in both sexes; the caudal extremity in the female is straight, incurved in the male. The œsophagus is longer and wider than the stomach; it contracts suddenly where it joins the latter organ; the stomach is cylindrical; the anus in the female is close to the caudal extremity, in the male it is a little more anterior, and projects considerably; the orifice by which the penis protrudes is seated between the anus and the caudal extremity. The penis is a double spiculum, very sharp, fine and white; the vulva in the female is situated nearer the caudal than the anterior extremity. Several of the females, after remaining for a short time in water (in which they at first moved about, but soon died), ruptured, and the intestine and ovaries protruded.

LVII.—*On the Antheridia and Spores of some species of* Fucus.

By MM. J. Decaisne and Gustave Thuret*.

The existence of sexes in the Algæ having been admitted, in our opinion, in the commencement of the last century, from incomplete observations, we went to the coast of the British Channel, with a view to throw some light upon this obscure point of science. Having met with various new facts in the course of our observations, we shall point out in a few words the principal results of our researches. Our investigations were principally made on *Fucus serratus, vesiculosus, nodosus* and *canaliculatus*.

The first two appeared to us dicœcious; the two others monœcious. The conceptacles, in the male individuals, are filled with articulated filaments, which bear numerous antheridia in the form of vesicles containing red granules. These antheridia are expelled by the orifice of the conceptacles; if we examine them with the microscope, we see issue from one of their extremities transparent corpuscles nearly pear-shaped, each one inclosing a single red globule; each one of these corpuscles is furnished with two very thin cilia, by means of which it moves with extreme vivacity.

The analogy of these corpuscles with what have been called the spermatic animalcules of *Chara*, the Mosses and the Liverworts, is very remarkable. In *Chara*, as in the Mosses, in *Marchantia, Targionia*, and the *Jungermanniæ*, one of us has ascertained the presence of the two locomotive cilia, inserted toward the extremity of a filiform body commonly wound spirally.

According to these observations, from the promptitude with which the corpuscles of the *Fucus* decompose and form, at the bottom of the vessel in which they are placed, a layer of inert granules which soon completely disappear, we think we are justified in regarding the vesicles which contain them as analogous to the antheridia of other cryptogamous plants, and we cannot admit the opinion which attributes to these vesicles the functions of sporangia, to the corpuscles those of spores.

Each spore of the dicœcious *Fuci* is simple, oval or pyriform, covered with a ciliated membrane similar to that of *Vaucheria*, but we have never remarked any motion in it.

After their exit from the conceptacles the spores present an extremely curious phænomenon. At first simple and perfectly undivided, they sooner or later separate into eight sporules, which are gradually isolated, become regularly spherical, and finally commence each one to germinate.

In *Fucus nodosus* and *F. canaliculatus* the conceptacles in-

* From the Comptes Rendus, Nov. 11, 1844.

close both spores and antheridia. In the first the spore, covered with a ciliated membrane, divides into four sporules, as MM. Crouan have already observed; but, as in the two preceding species, it is simple in the conceptacle.

The spores of *Fucus canaliculatus* present a very remarkable structure: the ciliated membrane which covers them presents very fine and close folds, which disappear soon after the spore has fallen to the bottom of the water, and which allow this membrane to extend and to form around the spores a large transparent margin. These spores divide into two sporules.

From the preceding observations we think we may draw the following conclusions:—

That some of the *Fuci* of our coasts contain diœcious species, and others monœcious.

That the spores of the *Fucaceæ*, however simple they may be in principle, follow in their division the number 2, or one of its multiples.

That in the present state of science, these characters of fructification being added to those of vegetation, require the establishment of three distinct genera:

Fucus (*F. serratus, vesiculosus,* &c.);
Ozothalia vulgaris (*F. nodosus*);
Pelvetia canaliculata (*F. canaliculatus*).

LVIII.—*On the Development, Structure and Œconomy of the Acephalocysts of Authors; with an account of the Natural Analogies of the Entozoa in general.* By Harry D. S. Goodsir, Cons. Mus. R.C.S.E.*

An opportunity having been afforded him by Dr. Gairdner of examining a large mass of hydatids taken after death from the abdomen of a patient who had been long labouring from distension of that cavity, Mr. Goodsir found that they belonged to a new form of Entozoon, which he has called *Diskostoma Acephalocystis*, the generic term being derived from the peculiar structure of the external membrane covering the vesicles; for this, examined under a high power, was seen to be intersected by numerous branching tubuli that arose by open mouths from numerous discs of different sizes. These open stomata and tubes appeared to be organs of nutrition. Immediately beneath the above membrane was another of more delicate texture, which sent off very fine septa that traversed and intersected the body of the hydatid, for the purpose apparently of rendering it support. The mode of generation and development of these animals is very simple. The young hydatids make their appearance as simple cells, gradually increasing in size, beneath the internal lining membrane of the

* Abstracted from the Transactions of the Royal Society of Edinburgh, having been read April 1, 1844.

parent vesicle; by the rupture of this membrane they escape into the parent cavity and become independent creatures. The external or tubular membrane, when placed under a powerful glass, was found to be studded with numerous small shining vesicles; these he considers to be the gemmules of this hydatid, which, like other Acephalocystic Entozoa, is gemmiparous. In addition to the two modes of propagation now stated, for the purpose of increasing the size and extent of its own individual group, this Entozoon has another whereby it can extend the species to uninfested portions of an infested animal; the cells which have been described as floating free within the body of the parent hydatid reach the healthy tissues which lie at some distance from the parasitic mass by some means which the author has been hitherto unable to detect. In general they are no deeper than the subserous tissue, but as they increase in size they always tend towards the surface of the infested cavity, and at length burst from their confinement, adhering at the same time to the bottom of their former locality by pedicles containing cellules. In another form of Cystic Entozoon, the *Cœnurus cerebralis*, which is met with in the brain of sheep and other Ruminants, the external membrane presented an appearance similar to that of the tubular membrane of the new Acephalocyst, although not so strongly marked. Numerous heads, armed superiorly with a double circle of hooks, are implanted by means of pedicles upon the external surface of the cyst. Now it is within these pedicles that layers of reproductive gemmules are found which exhibit in their earliest stage parts very analogous to those in the ovules of the higher animals, and are developed at first in one plane only from the germinal spot, but subsequently in a direction perpendicular to the original plane; the former of these is termed the *discoidal*, the latter the *vertical period* of development. These and other more minute details, which we must pass over, since without the plates they would not be sufficiently intelligible to the general reader, prove that the development of the *Cœnuri* is more complicated than in the Acephalocysts. The author concludes his paper by tracing some very curious analogies between the forms of Cystic Entozoa and those of other classes of the animal kingdom in the following words:—

"Beginning with what I conceive to be the lowest form of Entozoon at present known, the simple hydatid, I find in it the analogue, in its own class, of the typical forms of the Infusoria, as the *Volvocinæ*.

"Proceeding to the new form of hydatid described in this paper, I consider it as the analogue of the Polypifera, and of such forms as have *Alcyonidium* for their type. In both we find the same general basal mass, and the same mode of nutrition, in the hydatid, by means of disc-bearing stomata, each disc analogous to a polype, and in the *Alcyonidium* by tentaculated heads with stomach-cavities. Both forms also are compound, the general group deriving nourishment from the individuals, and the individuals deriving support from the group; so that in both cases, the general mass and individual stomata or polypes mutually tend to support one another. Both have two

modes of propagation—one for the extension of the original group, the other for the establishment of other groups.

"The Echinodermata are represented among the Entozoa in a curious and interesting manner by the suctorial forms of that class; that is, by those forms of Entozoa which are endowed with these organs as a means of adhesion or progression, such as *Distoma, Tristoma,* &c. The lowest form in this suctorial tribe is the *Diplozoon paradoxum* of Nordmann. I am inclined to consider *Diplozoon* as inferior to *Distoma* and other suctorial forms, not from its analogies, but from this circumstance, among others, that its whole organization is double, and consequently less centralized. The *Asteriadæ*, among the Echinodermata, are represented in the Entozoa by *Diplozoon* and other similar forms, which undoubtedly exist. The *Tristomæ* are represented by the flat *Echinidæ*, as the *Scutellæ*. In both the *Tristoma* and its echinodermatous analogue, the *Scutella*, we find the disc imperfect in certain parts of its edge, indicating the remains of a more divided or asteroid condition of the body. The *Distomæ* are the analogues of the true *Echinidæ*. A starfish folded up upon itself, so that the tips of its rays meet at one central point, constitutes that form of the Echinodermata known as the *Echinus*. In like manner, among the Entozoa *Diplozoon* holds the same relation to *Distoma*. The former has two intestinal tubes and two mouths, one for each body; the latter has two intestinal tubes, and only one mouth. In like manner also, the reproductive organs are similar. It thus appears that the *Distoma* is only a *Diplozoon* folded on itself, as *Echinus* is an *Asterias* folded back. There are certainly some few points of material difference between these two animals, a circumstance we naturally look for; but these, if properly observed, must be traced to the difference of centralization. *Distoma* is therefore superior to *Diplozoon*, as *Echinus* is to *Asterias*, having a more centralized organization.

"The Acanthocephalous Entozoa of Rudolphi are the analogues of the Crustacea. The *Echinorhynchi* are typical of this group among the Entozoa. On comparing an *Echinorhynchus* with a Crustacean, such as a Lernean, the relation between them is so like that of affinity, that they were at one time grouped together in the same class. When the Lernean Crustaceans have passed their period of locomotive existence and have become permanently fixed, their habits are exactly similar to those of the *Echinorhynchi*, the only difference being, that the former adheres to the external, and the latter to the internal surface of the body of the infested animal. The *Echinorhynchi* have a number of short extremities or limbs near their head, analogous to similar organs, or to the atrophied limbs of the *Lerneæ*. There is this difference, however, between these organs in the two sets of animals, namely, that in the one they have never become developed at any period of life so as to suit the purposes of locomotion, whereas in the other, and during its early stage of existence, they were fully developed and employed as organs of prehension and progression, but have only become atrophied during the stationary or parasitic period of life.

"The next, and the highest forms of Entozoa, are the *Cœlelmintha*, which on examination will be found analogous to the Annelida.

"It is a remarkable circumstance, that looking on them collectively as classes, the Crustacea and Annelida are the first in the animal series possessing a truly diœcious mode of generation. So is it with the analogues of these classes in the Entozoa, viz. the Acanthocephala and Cœlelmintha, the only groups in the class which are truly bisexual."

ANALOGIES.

ENTOZOA.	INFUSORIA.
1. Acephalocystis simplex.	1. Volvox globator.
	POLYPIFERA.
2. Diskostoma acephalocystis.	2. Alcyonidium.
(3. Tænia.	3. Nemertes?)
	ECHINODERMATA.
4. Diplozoon.	4. Asterias.
5. Scutella.	5. Tristoma.
6. Distoma hepaticum.	6. Echinus.
	CRUSTACEA.
7. Echinorhynchus.	7. Lernæa.
	ANNELIDA.
8. Ascaris.	8. Lumbricus.

BIBLIOGRAPHICAL NOTICES.

Tijdschrift voor Natuurlijke Geschiedenis en Physiologie. By Professors Van der Hoeven and De Vriese. Part VI. No. 4.

(Continued from vol. vii. p. 326.)

Description of a new species of *Bulla*, by J. Van der Hoeven. The following is the diagnosis: "Bulla albo-cincta, testa ovato-subglobosa, tenui, pallide brunnea, spira fasciis tribus et apertura albis; spira retusa. *Hab.* China."—Contributions to the natural history of Man (Remarks on the Negro race), by J. Van der Hoeven.—Contributions in Vegetable Physiology, by Dr. J. F. Hoffmann.—On the Nerves of Feeling, and the connexion between them and the Nerves of Motion, by J. Van Deen.—Prodromus Faunæ Homeri et Hesiodi, by G. P. F. Groshans.—Observations on an insect injurious to *Pinus Larix* (the larva of *Ornix argyropennella*, Treitschke, *Tinea Laricella*, Hübner), by A. Brants.—*Notices of Works*: Owen on *Lepidosiren*; Treviranus's Observations in Zootomy and Physiology; Hueck De Craniis Esthonum commentatio; Dr. H. Schlegel's figures of new or little-known Amphibia; Le Maire's Horticulteur universelle, and Flore des Serres et Jardins d'Angleterre; Endlicher's Principles of a new theory of the Generation of Plants; Link's selected anatomico-botanical Drawings; Icones Plantarum rariorum Horti regii botanici Berolinensis, by Link, Klotzsch, Otto and Kunth.

Part VII. Nos. 1 and 2.—Further remarks on the properties of

the Spinal Marrow, especially on the nervous circulation observed therein, by J. Van Deen.—On the genus *Voyria*, by F. L. Splitgerber; the new species described are, *V. clavata*, *V. nuda*, *V. aurantiaca* and *V. corymbosa*.—H. C. Van Hall on the formation and development of the Seed of *Crinum capense*.—Micrometrical determinations and Microscopical notices, by P. Harting.—On an extraordinary anomaly observed in the metamorphosis of the Silk-worm, by J. J. Bruinsma.—Some historical notices respecting Butterflies with caterpillar heads, by J. Van der Hoeven.—Description of new or little-known Lepidoptera, by J. Van der Hoeven.—*Notices of Works*: Dr. S. Kutorga against the Successive Origin of Organic Beings on the Earth; Schumacher on the Nerves of the Jaws and Gums; Brandt's Contributions to our knowledge of the natural history of Birds; Lichtenstein on the genus *Mephitis*; De Vriese, Report on the recent researches respecting the Specific Heat of Vegetables.

Nos. 3 and 4.—Nova genera et species Plantarum Floræ Javanicæ auctore Fr. Junghuhnio, pugillus primus.—On the normal and abnormal pitcher form of Leaves, by Dr. J. F. Hoffmann.—On Worms occurring in the Eyes of certain Animals and of Man; with a description of a hitherto undescribed Worm taken from the eye of a Horse, by Dr. A. Numan.—Enumeratio Filicum et Lycopodiacearum quas in Surinamo legit F. L. Splitgerber.—On the natural history of the Isle of Rottum, by Dr. L. A. Cohen.—Vrolijk and De Vriese on the change which the surrounding vapour undergoes during the development of increased temperature in the spadix of *Colocasia odora*.—*Notices of Works*: Dr. Henle on the comparative anatomy of the Larynx, especially of Reptilia; Dr. K. E. von Baer on the former distribution and entire annihilation of the Northern Sea-Cow (*Rytina*, Ill.), met with by Steller in 1745 on the coast of Behring Island, then just discovered, and which has been no more seen since 1768; De Symmetria et Asymmetria Organorum Animalitatis, imprimis Cranii, a Dr. C. G. Lucæ; Dr. F. Miescher's description and examination of *Monostoma bijugum*; Schegel's Amphibia, 4th Decade; Bischoff on *Lepidosiren paradoxa*, and Owen's description of *Lepidosiren annectens*; Dr. G. Kunze's Supplement to Schkuhr's Ferns.

Part VIII. Nos. 1 and 2.—Enumeratio Plantarum Zeelandiæ Belgicæ indigenarum, auctore Dr. R. B. Van den Bosch.—J. N. Ramaer on the Intestinal Papillæ.—Contributions to the knowledge of the Mouth Parts of some Hymenopterous Insects, by Dr. A. Brants.—On the Polypidoms found at Groningen in the Hondsrug, by Dr. Dassen.—Examination of a Foot with seven Toes, by Dr. Luyten.—Contributions to the Morphology of Bulbs, by W. H. De Vriese.—Observations respecting the first formation of Cells and their Nuclei in Vegetables and Animals, founded on the investigation of Inorganic Precipitates, by P. Harting.—*Notices of Works, &c.*: Reminiscences of Fr. J. F. Meyen, by W. H. De Vriese; Histoire d'un petit Crustacée (*Artemia salina*), by N. Joli; Fossil Remains of an Ape and some other Mammalia from Greece, by Dr. A.

Wagner; Description of some new *Rodentia*, by the same; Spicilegia Ornithologica Exotica, auctore J. F. Brandt; On the Lymphatic Hearts of Tortoises, by Prof. Müller; Microscopic researches in Human Physiology, by O. Köstlin; Remarks on Liebig's Organic Chemistry in its application to Agriculture and Physiology; On the Appendage of the Brain, and on the Pituitary Gland, by J. Engel; Anatomy of the Amphibia, by Carl Vogt; Contributions to the Anatomy of Compound Eyes with Facetted Cornea, by F. Will; *Echiniscus Bellarmanni*, animal crustaceum *Macrobioto Hufelandii* affine, auctore Dr. Schultze.

Nos. 3 and 4.—New additions to the Flora of the Netherlands, by H. C. Van Hall.—Contributions to the Flora of Leyden, by F. Dozy.—Great Blood-corpuscles in *Cryptobranchus japonicus*, by J. Van der Hoeven.—On the species of the genus *Limulus*, by J. Van der Hoeven.—Contributions to the Anatomy of *Stenops Kukang* (*Nycticebus javanicus*), by J. L. C. Schroeder Van der Kolk.—On the genus *Stenops*, with descriptions of some species, by J. Van der Hoeven.—Excursion to the Forests of the mountains Malabar, Wayang and Tilu in Java, by Fr. Junghuhn.—*Notices of Works*: Collection of Notices respecting *Amphioxus lanceolatus*; Anatomico-physiological researches on the *Salpæ*, by Professor Eschricht; Anatomical description of *Chelyosoma Macleayanum*, by Prof. Eschricht; First Report of the Zootomico-physiological Institute of the University of Rostock, by H. Stannius; Munus Natalitium Anatomicum De novis sub Lingua Bursis, by Dr. Fleischmann; Actiniæ, Echinodermata and Worms of the Adriatic and Mediterranean, by Dr. A. E. Grube; De *Apodis cancriformis* anatome et historia evolutionis, auctore E. G. Zaddoch; L'Homme Américain, &c., by Alcide D'Orbigny; Descriptive Iconography of the *Cacteæ*, by C. H. Lemaire; On the Structure of the *Balanophori*, by H. R. Gœppert; Filicum Species in Horto regio botanico Berolinensi cultæ, descripsit H. F. Link; Persistence de la Vie dans les Végétaux, par M. Pepin; *Ficus Saussuriana*, by A. P. DeCandolle; Necrology of A. P. DeCandolle.

PROCEEDINGS OF LEARNED SOCIETIES.

ZOOLOGICAL SOCIETY.

March 12, 1844.—William Yarrell, Esq., Vice-President, in the Chair.

Mr. Lovell Reeve described thirty-three new species of *Arca*:—

Arca pilula. *Arca testâ orbiculari, valdè gibbosâ, subinæquivalvi, vix inæquilaterali, lateribus supernè angulatis, infrà rotundatis; albidâ, fuscescente pallidè tinctâ, epidermide fuscâ, inter costas setosâ, indutâ; radiatim costatâ, costis quinque vel sex et viginti, angustis, valvæ sinistralis omnibus, valvæ dextralis anticis tantum, subtiliter nodulosis; umbonibus subremotis, ligamenti aream elongato-rhomboideam.*

Conch. Icon. *Arca*, pl. 2. f. 8.

Hab. Island of Burias, Philippines (found in sandy mud at the depth of six fathoms); Cuming.

This species is so exceedingly gibbous that the shell is as wide as it is high, and it is the same in all stages and varieties of growth.

ARCA ANOMALA. *Arca testâ quadrato-ovatâ, subcompressâ, inæquivalvi, latere antico rotundato, postico subangulato-rotundato; albâ, viridescente pallidè tinctâ, epidermide corneâ inter costas sparsim indutâ; radiatim costatâ, costis octo et viginti, valvæ dextralis lævibus, planulatis, sinistralis convexis, nodulosis; ligamenti aream angustâ.*

Conch. Icon. *Arca*, pl. 2. f. 9.

Hab. —— ?

It seems rather anomalous that the ribs in one valve of this shell should be convex and nodulous, whilst in the other they are flat and smooth; but it is an interesting fact that the larger valve of the inequivalve species of *Arca* exhibits a much more elaborate style of sculpture than the smaller. The *Arca pilula* just described shows this remarkable peculiarity very distinctly, but not so prominently as the species under consideration; and it now remains to be determined whether this difference arises from any superiority of organization in the left lobe of the mantle of the animal inhabitant.

ARCA HOLOSERICA. *Arca testâ obliquè quadratâ, æquivalvi, lateribus supernè angulatis, antico infrà rotundato, postico angulato-extenso; albidâ, epidermide holosericâ obtectâ; radiatim costatâ, costis duabus vel tribus et triginta, creberrimis, planulatis, umbones versus minutissimè pertuso-cancellatis; umbonibus subobliquis; ligamenti aream latiusculâ.*

Conch. Icon. *Arca*, pl. 2. f. 11.

Hab. Island of Samar, Philippines (found in coarse sand and gravel at the depth of four fathoms); Cuming.

This is a very fine species, remarkable not only on account of its general form and velvety epidermis, but for the minute cancellated sculpture of the umbones.

ARCA GUBERNACULUM. *Arca testâ subelongato-ovatâ, compressiusculâ, inæquivalvi, lateribus supernè angulatis, latere antico valdè breviore, postico compresso-expanso; viridescente, epidermide inter costas squamosâ indutâ; radiatim costatâ, costis duabus vel tribus et triginta, planulatis, leviter noduloso-serratis; ligamenti aream angustâ.*

Conch. Icon. *Arca*, pl. 3. f. 11.

Hab. Basey, island of Samar, Philippines (found in coarse sand and amongst shells at the depth of four fathoms); Cuming.

This shell may be recognised by the compressly expanded character of the posterior side.

ARCA CORNEA. *Arca testâ subquadratâ, gibbosiusculâ, inæquivalvi, lateribus supernè angulatis, infrà rotundatis, latere antico breviore; albâ, corio tenui, corneo, viridescente, epidermide inter costas squamosâ indutâ; radiatim costatâ, costis ad novem et viginti, valvæ*

dextralis planis, sinistralis noduloso-crenatis; ligamenti areâ mediocri.

Conch. Icon. *Arca*, pl. 3. f. 16.

Hab. Basey, island of Samar, Philippines (found in sandy mud at low water); Cuming.

The horny covering of this species is of an unusually transparent character.

Arca gibbosa. *Arca testâ rotundato-ovatâ, gibbosissimâ, æquivalvi, lateribus subangulatis, infrà rotundatis, latere antico breviore; albidâ, epidermide fuscâ indutâ; radiatim costatâ, costis sex vel septem et viginti, rotundatis, angustis, leviter nodulosis; ligamenti areâ mediocri.*

Conch. Icon. *Arca*, pl. 4. f. 20.

Hab. —— ?

This shell is almost as round as the *Arca pilula*, from which it differs however essentially in having the umbones obliquely turned to the anterior, and the ribs rounded.

Arca maculosa. *Arca testâ obliquè ovatâ, æquivalvi, lateribus supernè subattenuato-angulatis, infrà rotundatis, antico brevissimo, postico obliquè extenso; albidâ, fuscescente tinctâ, latere postico maculis perpaucis fuscis ornato, epidermide tenui, corneâ, inter costas setosâ, obtectâ; radiatim costatâ, costis ad sex et triginta, planulatis, confertis, marginibus serratis, posticis leviter nodulosis, anticis prope marginem sulco divisis; umbonibus pallidè rufescentibus; ligamenti areâ mediocri, declivi.*

Conch. Icon. *Arca*, pl. 4. f. 24.

Hab. North coast of New Holland.

It is scarcely possible to conceive two species more immediately allied than this and the *Arca scapha*, though perfectly distinguished by the number and arrangement of the ribs, which in the former are divided by a narrow cut rather than a groove; the scattered brown spots, though few in number, are also peculiar to the *Arca maculosa*.

Arca compacta. *Arca testâ subelongato-quadratâ, inæquivalvi, gibbosâ, lateribus supernè angulatis, antico breviore, postico leviter angulato-extenso; albidâ, epidermide fuscâ partim indutâ; radiatim costatâ, costis tricenis, valvæ dextralis subangustis, planulatis, sinistralis latioribus, rotundatis, interstitiis cancellatis; ligamenti areâ subangustâ, declivi.*

Conch. Icon. *Arca*, pl. 5. f. 27.

Hab. —— ?

This is a short compact shell of rather solid growth.

Arca pertusa. *Arca testâ subobliquè quadratâ, vix æquivalvi, lateribus supernè angulatis, infrà rotundatis; albidâ, viridescente tinctâ, epidermide fuscâ sparsim indutâ; radiatim costatâ, costis duabus vel tribus et triginta, confertis, plano-convexis, subtilissimè pertusis; ligamenti areâ latiusculâ, umbonibus subcentralibus.*

Conch. Icon. *Arca*, pl. 5. f. 28.

Hab. Mouth of the Gambia, Africa.

The ribs of this shell are very finely pricked or indented, a character which I do not remember to have observed in any other species.

ARCA CISTULA. *Arca testâ subquadratâ, inæquivalvi, lateribus supernè angulatis, antico infrà rotundato, postico quadrato; albâ, epidermide tenui fuscescente, inter costas squamosâ, indutâ; radiatim costatâ, costis angustis, numerosis, septem vel octo et triginta, valvæ sinistralis umbones versus subtilissimè nodulosis; ligamenti aream mediocri; umbonibus subacutis, prope extremitatem anticam dispositis.*

Conch. Icon. *Arca*, pl. 5. f. 29.

Hab. —— ?

An interesting species, remarkable for the neatness and regularity of the ribs, as well as for the very anterior situation of the umbones.

ARCA INFLATA. *Arca testâ obliquè ovatâ, tenui, inflatâ, vix æquivalvi, lateribus supernè leviter angulatis, infrà rotundatis; albidâ, epidermide corneâ fuscâ, inter costas squamosâ, indutâ; radiatim costatâ, costis numerosis, quadragenis, planulatis, lævibus; ligamenti aream subangustâ, declivi; umbonibus tumidis, paululùm approximatis.*

Conch. Icon. *Arca*, pl. 5. f. 30.

Hab. Ilo Ilo, isle of Panay, Philippines (found in soft mud at the depth of six fathoms); Cuming

This is a light inflated shell of rather large size, at present unique in the collection of Mr. Cuming.

ARCA CYMBÆFORMIS. *Arca testâ elongato-ovatâ, tumidiusculâ, inæquivalvi, posticè attenuatâ; albidâ, epidermide corneâ viridescente, inter costas squamosâ, indutâ; radiatim costatâ, costis duabus et triginta, valvæ sinistralis rotundatis, tuberculato-crenatis, valvæ dextralis planulatis, anticis tantum crenatis; ligamenti aream parvâ, declivi.*

Conch. Icon. *Arca*, pl. 5. f. 31.

Hab. —— ?

This is a shell of very peculiar growth, inasmuch as the posterior side is smaller and more attenuated than the anterior, a condition reverse to that usually presented.

ARCA JAPONICA. *Arca testâ elongato-ovatâ, tenuiculâ, valdè inæquivalvi, lateribus rotundatis, postico latiore, antico brevissimo; albâ, epidermide corneâ fuscescente, inter costas squamosâ, indutâ; radiatim costatâ, costis quinque et triginta, angustis, lævibus, planulatis, anticis subobsoletè nodulosis; ligamenti aream angustissimâ.*

Conch. Icon. *Arca*, pl. 5. f. 32.

Hab. Coast of Japan (found in sandy mud); Dr. Siebald.

The lateral extremities of this shell are peculiarly rounded.

ARCA VELLICATA. *Arca testâ trapeziformi, subcompressâ, in medio leviter contractâ, vix æquivalvi, lateribus supernè angulatis, antico infrà rotundato, postico angulato-expanso; albidâ, epidermide, inter costas squamosâ, partim indutâ; radiatim costatâ, costis angustis, numerosissimis, quinquagenis aut pluribus, anticis sulco*

divisis; ligamenti aread angustâ; umbonibus latis, peculiariter depresso-vellicatis.

Conch. Icon. *Arca*, pl. 5. f. 33.

Hab. —— ?

This is a very remarkable shell, both on account of the large number of ribs, and of the peculiar compression of the umbones.

Arca gambiensis. *Arca testâ elongato-quadratâ, tenuiculâ, valdè compressâ, in medio coarctatâ, æquivalvi, lateribus rotundatis, postico subangulato extenso; albidâ, epidermide tenui olivaceâ, sparsim setigerâ, indutâ; radiatim costatâ, costis duabus vel tribus et viginti, lævigatis, plano-expansis, lirâ exili intercurrente; ligamenti areâ parvâ, angustâ; umbonibus angulato-mucronatis.*

Conch. Icon. *Arca*, pl. 6. f. 36.

Hab. Mouth of the Gambia, Africa (found in sandy mud in deep water).

The ribs of this shell become peculiarly flattened and spread out towards the margin, and there is a fine ridge running down the centre of the intermediate grooves. This is the only species in which I have as yet observed any kind of fine interribbing.

Arca cuneata. *Arca testâ obliquè ovatâ, æquivalvi, marginem versus coarctatâ, lateribus supernè angulatis, infrà obliquè rotundatis; albidâ, radiatim costatâ, costis ad vicenas, rotundatis, irregulariter nodosis; ligamenti areâ latissimâ, declivi; umbonibus parvis, distantibus.*

Conch. Icon. *Arca*, pl. 6. f. 37.

Hab. Zanzibar.

The great width of the ligamentary area, separating the umbones asunder to a considerable extent, imparts a wedge-like form to this shell, by which it may be easily recognised.

Arca secticostata. *Arca testâ elongato-ovatâ, gibbosissimâ, tenuiculâ, lateribus supernè angulatis, infrà subobliquè rotundatis; albidâ, fuscescente partim tinctâ; radiatim costatâ, costis numerosis, angustis, ad quadragenas, quamplurimis sulco subprofundo divisis; ligamenti areâ elongatâ, latiusculâ; umbonibus tumidis.*

Conch. Icon. *Arca*, pl. 6. f. 38.

Hab. —— ?

This shell is probably one of those that have been confounded with the *Arca antiquata*; it differs in having a much greater number of ribs, and a larger proportion of them more distinctly grooved.

Arca ferruginea. *Arca testâ ovato-oblongâ, æquivalvi, lateribus rotundatis; albidâ, epidermide ferrugineo-fuscâ indutâ; radiatim costatâ, costis ad septem et viginti, angustis, compressis, subtilissimè nodulosis; ligamenti areâ subangustâ; umbonibus obliquè incurvis.*

Conch. Icon. *Arca*, pl. 6. f. 39.

Hab. —— ?

The ribs of this species are unusually narrow, and being finely nodulous, present a kind of beaded appearance.

Arca radiata. *Arca testâ ovato-oblongâ, æquivalvi, lateribus ro-*

tundatis; albidâ, fuscescente ad umbones tinctâ, epidermide sparsim indutâ; radiatim costatâ, costis ad tricenas, angustissimis, obsoletè nodulosis, interstitiis clathratis; ligamenti areâ mediocri.

Conch. Icon. *Arca*, pl. 6. f. 40.

Hab. ——?

The ribs are much less prominently developed than in the preceding species; they are also narrower, more numerous, and less strongly noduled.

Arca obliqua. *Arca testâ ovatâ, valdè obliquâ, æquivalvi, lateribus supernè angulatis, infrà rotundatis, antico brevissimo, postico obliquè expanso; albâ, epidermide fuscescente sericâ, inter costas setosâ, indutâ; radiatim costatâ, costis quinque vel sex et triginta, planulatis, confertis, interstitiis subtilissimè striatis, anticis posticisque leviter crenatis, anticis sulco divisis; ligamenti areâ subangustâ, declivi; umbonibus approximatis.*

Conch. Icon. *Arca*, pl. 6. f. 41.

Hab. West coast of Africa.

This is a very interesting species, and altogether one of very distinct character.

Arca myristica. *Arca testâ subquadrato-ovatâ, gibbosiusculâ, inæquivalvi, lateribus angulato-rotundatis; albâ, epidermide tenui rubido-fuscescente indutâ; radiatim costatâ, costis tribus vel quatuor et viginti, valvæ sinistralis omnibus nodulosis, dextralis anticis tantum; ligamenti areâ subangustâ.*

Conch. Icon. *Arca*, pl. 7. f. 42.

Hab. Jimamailan, island of Negros, Philippines (found in sandy mud at the depth of three fathoms); Cuming.

In this species there is no trace of that peculiar green colour which is so prominent in the following.

Arca chalcanthum. *Arca testâ oblongo-quadratâ, subcompressâ, inæquivalvi, lateribus supernè angulatis, latere antico brevissimo, postico latiore, compressâ; albidâ, corio corneo viridi, epidermide fuscâ, indutâ; radiatim costatâ, costis octo et viginti, angustis, valvæ sinistralis leviter nodulosis; ligamenti areâ subangustâ.*

Conch. Icon. *Arca*, pl. 7. f. 43.

Hab. San Nicolas, island of Zebu, Philippines (found in sandy mud at the depth of six fathoms); Cuming.

The peculiar colour of this shell gives it the appearance of having been stained with green copperas.

Arca luzonica. *Arca testâ elongato-quadratâ, gibbosiusculâ, æquivalvi, lateribus supernè angulatis, infrà rotundatis, latere antico brevi; albidâ, corio corneo viridescente, epidermide fuscâ, indutâ; radiatim costatâ, costis octo et viginti, latiusculis, valvæ sinistralis subobsoletè nodulosis; ligamenti areâ subangustâ, declivi.*

Conch. Icon. *Arca*, pl. 7. f. 44.

Hab. Island of Luzon, Philippines (found in sandy mud at low water); Cuming.

This is a stouter shell than the preceding species; it is more gibbous, and the ribs are broader.

Arca rotundicostata. *Arca testâ ovatâ, gibbosâ, æquivalvi, lateribus supernè angulatis, antico brevi, rotundato, postico subangulato-extenso; albâ, umbones versus fuscescente tinctâ; radiatim costatâ, costis ad vicenas, subdistantibus, elevatis, rotundatis, crenatis, valvæ sinistralis potiùs latioribus; ligamenti areâ latâ, paululùm concavo-declivi.*

Conch. Icon. *Arca*, pl. 7. f. 46.

Hab. —— ?

A species in which the ribs are peculiarly rounded.

Arca clathrata. *Arca testâ subquadrato-ovatâ, æquivalvi, lateribus leviter compressis, supernè angulatis, infrà rotundatis; albidâ, epidermide tenui fuscescente, inter costas exilissimè setosâ, indutâ; radiatim costatâ, costis leviter crenatis, interstitiis profundis, lineis elevatis clathratis; ligamenti areâ subelongatâ.*

Conch. Icon. *Arca*, pl. 7. f. 48.

Hab. Islands of Burias and Ticao, Philippines (found at the depth of about six fathoms); Cuming.

A small species, in which the interstices between the ribs, which are very deeply engraved, are distinctly latticed with raised lines.

Arca ovata. *Arca testâ subelongato-ovatâ, tenui, valdè inæquivalvi, lateribus supernè angulato-rotundatis, postico breviore, subtùs angulato-extenso, antico attenuato-rotundato; albidâ, rufescente-fusco tinctâ, epidermide tenuissimâ; radiatim costatâ, costis ad tricenas, anticis nodulosis, posticis minus distinctioribus, planulatis, lævibus, costis valvæ sinistralis valdè latioribus; ligamenti areâ parvâ, latiusculâ.*

Conch. Icon. *Arca*, pl. 8. f. 49.

Hab. St. Elena, South America (found in sandy mud at the depth of from six to eight fathoms); Cuming.

This shell partakes of the characters of the *Arcæ Brasiliana* and *incongrua*; it is however more elongated than either, and the ribs are narrower and more in number.

Arca crenata. *Arca testâ subelongato-quadratâ, subcompressâ, solidiusculâ, vix æquivalvi, lateribus angulato-rotundatis; albidâ, epidermide tenui fuscâ indutâ; radiatim costatâ, costis septem vel octo et triginta, valvarum ambarum omnibus noduloso-crenatis; ligamenti areâ subangustâ, declivi, umbonibus depresso-approximatis.*

Conch. Icon. *Arca*, pl. 8. f. 51.

Hab. —— ?

This species may be distinguished by its multiplicity of ribs, coupled with the manner in which the whole of them in both valves are crenated.

Arca globosa. *Arca testâ globosâ, tumidâ, subæquivalvi, lateribus supernè subangulatis, antico breviore; albidâ, epidermide corneâ fuscâ indutâ; radiatim costatâ, costis duabus vel tribus et triginta, lævibus, planulatis; ligamenti areâ mediocri, umbonibus latiusculis, subapproximatis.*

Conch. Icon. *Arca*, pl. 8. f. 52.

Hab. Catbalonga, island of Samar, Philippines (found in coarse sand and gravel at the depth of four fathoms); Cuming.

Chiefly characterized by its globular form and the smooth horny nature of the epidermis.

ARCA RUFESCENS. *Arca testâ elongato-ovatâ, valdè inæquivalvi, lateribus supernè leviter angulatis, infrà rotundatis, postico subelongato-extenso; albidâ, rufescente tinctâ, epidermide inter costas partim indutâ; radiatim costatâ, costis numerosis, quadragenis, confertis, lævibus; ligamenti areâ mediocri, umbonibus subtruncatis.*

Conch. Icon. *Arca*, pl. 8. f. 53.

Hab. ——?

This shell is of a more solid structure than the *Arca inæquivalvis*; the ribs are much more numerous and close-set, and independent of the difference of colour, there is a truncated peculiarity in the umbones.

ARCA CONTRARIA. *Arca testâ obliquè ovatâ, solidâ, turgidâ, æquivalvi, lateribus rotundatis, postico brevi, antico elongato-extenso; albidâ, epidermide sericâ fuscâ crassâ partim indutâ; radiatim costatâ, costis tricenis, lævibus; ligamenti areâ latiusculâ, declivi; umbonibus contrariè contortis.*

Conch. Icon. *Arca*, pl. 8. f. 55.

Hab. ——?

This is another contrary or reversed species, and a very remarkable one, the shell being completely reversed, whilst the position of the ligamentary area remains the same. This and the *Arca reversa*, Gray, are the only species of the genus I have as yet seen exhibiting this peculiarity of growth.

ARCA ANGICOSTATA. *Arca testâ subquadrato-ovatâ, subæquivalvi, lateribus supernè angulatis, infrà rotundatis, antico brevi; albidâ, fuscescente partim tinctâ, epidermide fuscâ, inter costas squamosâ, indutâ; radiatim costatâ, costis ad tricenas, anticis angustis, subdistantibus, leviter crenulatis, posticis latioribus, expansioribus; ligamenti areâ latiusculâ.*

Conch. Icon. *Arca*, pl. 9. f. 57.

Hab. ——?

There is a very unusual disproportion in the width of the ribs of this species, the anterior ribs being exceedingly narrow, whilst the posterior are wider and spread out as it were.

ARCA LORICATA. *Arca testâ subquadratâ, gibbosâ, lateribus supernè attenuato-angulatis, antico brevi, rotundato, postico angulato-extenso; albidâ, corio corneo cæruleo-viridescente loricatâ, epidermide tenui, fuscâ, inter costas squamosâ, indutâ; radiatim costatâ costis septem vel octo et viginti, planiusculis, acutangulis; umbonibus subapproximatis; ligamenti areâ leviter declivi.*

Conch. Icon. *Arca*, pl. 9. f. 58.

Hab. ——?

This shell is covered with a peculiarly strong horny cuticle, and

differs from any previously described species in the arrangement and formation of the ribs.

ARCA DISPARILIS. *Arca testâ ovatâ, tenui, subcompressâ, valdè inæquivalvi, lateribus angulato-rotundatis, latere postico subcompresso-expanso; albidâ, corio corneo tenui cæruleo-viridescente, epidermide fuscâ indutâ; radiatim costatâ, costis sex vel septem et triginta, planiusculis, umbones versus obsoletè crenulatis; umbonibus subapproximatis; ligamenti areâ angustâ, declivi.*

Conch. Icon. *Arca*, pl. 9. f. 59.

Hab. —— ?

The nearest approach to the *Arca inæquivalvis*, but a shell of more compressed growth; the valves exhibit a still greater disparity of size, and the ribs are rather more numerous.

ARCA CREBRICOSTATA. *Arca testâ elongato-quadratâ, æquivalvi, lateribus supernè angulatis, antico infrà rotundato, postico elongato-extenso, subattenuato; albâ, epidermide fuscâ holosericâ indutâ; radiatim costatâ, costis numerosissimis, tribus vel quatuor et quadraginta, planis, latiusculis, creberrimis, anterioribus sulco divisis, subtilissimè crenulatis; umbonibus latis, subapproximatis; ligamenti areâ angustâ, declivi.*

Conch. Icon. *Arca*, pl. 9. f. 61.

Hab. —— ?

The ribs of this species are very characteristic, being comparatively broad, flat, very close-set, and more in number than in any other of the genus.

ARCA HIANS. *Arca testâ elongato-ovatâ, æquivalvi, anticè hiante, lateribus rotundatis, postico attenuato-extenso; albidâ, fuscescente pallidè tinctâ, epidermide fuscâ, inter costas squamosâ, indutâ; radiatim costatâ, costis duabus vel tribus et triginta, latiusculis, planulatis, anticis subobsoletè crenulatis, sulco latissimo divisis; umbonibus subapproximatis; ligamenti areâ angustâ, profundè declivi.*

Conch. Icon. *Arca*, pl. 9. f. 62.

Hab. —— ?

The shape of the *Arca hians* approaches somewhat to that of the *Arca cymbæformis*, but the species differ most essentially from each other on examination. In the *Arca hians* the valves are equal, the anterior ribs are divided by an unusually broad groove, and the shell gapes at the anterior end to the extent of about three-sixteenths of an inch, a peculiarity of which I have not observed the slightest indication in any other species of this division of the *Arcæ*.

ARCA OCCLUSA. *Arca testâ subquadratâ, valdè gibbosâ, inæquivalvi, lateribus supernè attenuato-angulatis; albâ; radiatim costatâ, costis septem vel octo et viginti, subdistantibus, valvæ dextralis lævibus, sinistralis nodulosis; umbonibus prominentibus, peculiariter approximatis; ligamenti areâ subdeclivi.*

Conch. Icon. *Arca*, pl. 10. f. 64.

Hab. —— ?

The umbones of this shell are so closely approximated over the

ligamentary area, as to prevent the valves from opening beyond the extent of about a quarter of an inch.

ARCA AMBIGUA. *Arca testâ subquadratâ, tenuiculâ, inæquivalvi, lateribus subattenuato-angulatis, antico infrà rotundato, postico angulato; albidâ, epidermide fuscâ, inter costas squamosâ, indutâ; radiatim costatâ, costis tribus vel quatuor et triginta, angustis, rotundatis, anticis subtilissimè rotundatis; ligamenti areâ subangustâ.*

Conch. Icon. *Arca*, pl. 10. f. 65.

Hab. —— ?

The *Arca cistula* is the nearest allied species to this.

ARCA CEPOIDES. *Arca testâ subquadrato-ovatâ, tenui, ventricosâ, inæquivalvi, lateribus angulato-rotundatis; albidâ, fuscescente pallidè tinctâ, corio corneo cærulescente, epidermide fuscâ, inter costas squamosâ, indutâ; radiatim costatâ, costis duabus et triginta, lævibus, planulatis, costis valvæ sinistralis sublatioribus; umbonibus tumidis; ligamenti areâ latiusculâ, valdè declivi.*

Conch. Icon. *Arca*, pl. 10. f. 66.

Hab. San Miguel, South America (found in sandy mud); Cuming.

This is a fine bold species, but it does not exhibit any very striking peculiarity of character.

ARCA HANKEYANA. *Arca testâ obliquè ovatâ, crassiusculâ, valdè gibbosâ, tumidâ, æquivalvi, lateribus rotundatis, supernè attenuatis, latere antico brevissimo, postico obliquè extenso; albâ, epidermide tenui, inter costas hirsutâ, sparsim indutâ; radiatim costatâ, costis duabus vel tribus et triginta, planulatis, confertis, quadriliratis; umbonibus parvis, distantibus; ligamenti areâ brevi, latâ, declivi.*

Conch. Icon. *Arca*, pl. 10. f. 68.

Hab. Harbour of Mozambique (found in a mass of white coral on the reefs at low water, spring tide); Hankey.

I close this division of the genus with a new species, which exhibits a peculiarity in the structure of the ribs of great novelty and interest, each of them being composed of four distinctly separated ridges.

I have great pleasure in naming this important species after the gentleman to whom I am indebted for it, Lieut. Hankey, R.N., a zealous conchologist, whose researches on the coast of Africa have greatly contributed to science.

The following description of some new species of *Columbella*, in the collection of H. Cuming, Esq., by Mr. G. B. Sowerby, was then read:—

COLUMBELLA DUCLOSIANA, nob., Thes. Conch. part 4. pl. 36. f. 15, 16. *Col. testâ ovatâ, utrinquè acuminatâ, longitudinaliter costellatâ, saturatè fuscâ, zonis binis pallidioribus; spirâ acuminatâ, anfractibus 5, costatis, ultimâ magnâ parte ventrali longitudinaliter costatâ, interstitiis costarum transversim striatis, dorsali lævigatâ, anticè transversim striatâ; aperturâ latiusculâ, flexuosâ, nigricante; labio externo crasso, intùs denticulis 8–9, posticis majori-*

bus; interno posticè callifero; canali breviter acuminato, subreflexo; epidermide crassiusculâ.

Epidermis coarse and rough. Found under stones on the coast of Malacca by H. Cuming; also from Java.

Columbella chlorostoma, nob., Thes. Conch. pl. 36. f. 17, 18. *Col. testâ ovatâ, longitudinaliter costatâ, lævi, albâ, nigro-maculatâ; spirâ mediocri, anfractibus* 5, *subventricosis, costatis, ultimo anticè transversim striato, parte dorsali anticâ costis obsoletis; aperturâ oblongâ, latiusculâ, peritremate fulvescente; labio externo posticè angulato.*

A single specimen is in the collection of M. Petit de la Saussaye, which he has obligingly communicated. It is not *Buccinum chlorostoma* of Wood.

Columbella rudis, nob., Thes. Conch. pl. 36. f. 33, 34, 35. *Col. testâ oblongâ, rudi, plerumquè albidâ, punctis strigisque irregulariter ornatâ; spirâ longiusculâ, acutiusculâ, anfractibus* 7, *transversim crassè granuloso striatis, posticè anguliferis, ultimo magno; aperturâ subflexuosâ, albâ, peritremate posticè angulifero; canali subreflexâ.*

From Nevis: in Mr. Cuming's and other collections.

Columbella pœcila, nob., Thes. Conch. pl. 37. f. 51, 52. *Col. testâ ovatâ, utrinquè subacuminatâ, transversim striatâ, fulvâ, lineis* 2–3 *transversis castaneis, maculisque albis variegatâ; anfractibus* 5–6, *posticè subcoronatis, ultimo magno, subtrigonali; aperturâ latiusculâ, flexuosâ, labii externo medio subcoarctato.*

Two specimens only were brought from Matnog by H. Cuming.

Columbella venusta, nob., Thes. Conch. pl. 37. f. 53, 54. *Col. testâ oblongâ, lævigatâ, pallescente, strigis maculisque castaneis, undatis, punctisve albis ornatâ; spiræ apice nigricante; anfractibus* 6, *ultimo magno, anticè transversim striato; aperturâ latiusculâ, labio externo extùs striato, interno denticulis externis* 8–9, *internis* 2–3; *canali latiusculo.*

A very graceful species, brought lately from the Swan River Settlement.

Columbella splendidula, nob., Thes. Conch. pl. 37. f. 65, 66. *Col. testâ oblongâ, lævi, aurantiacâ, maculis albis castaneisque variegatâ; spirâ breviusculâ, subacuminatâ; anfractibus* 7–8, *brevibus, ultimo magno, anticè transversim striato; aperturâ subflexuosâ, albâ; labio externo extùs varicoso, margine tenuiusculo; labio interno anticè laminâ levatâ columellari instructo; canali brevi, subreflexo.*

Found in coarse sand at a depth of seven fathoms, near the island of Corregidor, bay of Manila, by H. Cuming.

Columbella obscura, nob., Thes. Conch. pl. 37. f. 70, 71. *Col. testâ oblongâ, lævi, obscurè fulvâ, strigis longitudinalibus nigris; spirâ subacuminatâ, anfractibus* 7, *posticè albo nigroque articulatis, ultimo anticè transversim sulcato; labio interno subincrassato, margine acutiusculo, intùs medianè dentibus* 3–4 *obsoletis; interno*

anticè laminam levatam columellarem efformante; canali brevi, subreflexo.

North-west coast of New Holland; Mr. Cuming's collection.

Columbella coniformis, nob., Thes. Conch. pl. 37. f. 77, 78. *Col. testâ ovato-turbinatâ, lævi, pallidâ, coloribus variis pictâ; spirâ breviter conicâ, anfractibus 7, primis sex medio obtusè angulato, marginibus propè suturam levatiusculis; ultimo anfractu magno, elongato-conico, anticè transversim striato; labio externo tenuiusculo, intùs denticulis plurimis; canali subreflexo.*

In Mr. Cuming's collection.

Columbella aspersa, nob., Thes. Conch. pl. 37. f. 79, 80. *Col. testâ oblongo-ovatâ, lævi, albâ, castaneo-reticulatâ et maculatâ; spirâ subacuminatâ, apice obtuso, anfractibus 6, posticè rotundatis, ultimo anticè transversè obsoletè striato; aperturâ latiusculâ, flexuosâ, labio externo intùs medianè tuberculato denticulis obsoletis, margine lævigato; canali latiusculo, brevi.*

Two specimens are in Mr. Cuming's and one in Lady Harvey's collection: locality unknown.

Columbella Ligula, Ducl., Thes. Conch. pl. 38. f. 83, 84, 85. *Col. testâ oblongâ, acuminatâ, lævi, albidâ, coloribus variis fasciatim pictâ; spirâ elongatâ, turritâ, anfractibus 8–9, subventricosis, nitidis, ultimo magno; labio externo extùs crassiusculo, variciformi, intùs denticulato; labio interno anticè laminam levatam columellarem efformante, intùs denticulis, rugosiusculo.*

Found by Mr. Cuming at Ticao.

Columbella Fabula, nob., Thes. Conch. pl. 38. f. 86, 87; *C. Sadonosta*, Ducl. *Col. testâ ovatâ, lævi, pallidâ, coloribus obscuris variis pictâ; spirâ acuminatâ, conicâ, apice acuto; anfractibus 6–7, margine suturarum levatiusculo; ultimo magno, anticè transversim striato; aperturâ latâ, labio externo tenuiusculo, posticè subemarginato, intùs in mediam subtumido, denticulato; canaliculato.*

A variety has been found under stones in the bay of Muerte, island of Corregidor, by Mr. Cuming.

Columbella vulpecula, nob., Thes. Conch. pl. 38. f. 93. *Col. testâ ovatâ, crassâ, lævi, albidâ, ferrugineo-marmoratâ; spirâ subacuminatâ, anfractibus 6–7, ultimo magno, leviter transversim striato, anticè striis validioribus; labio externo crasso, extùs transversim striato, intùs in mediam tumido, denticulato; aperturâ flexuosâ; canali lato, brevi.*

Columbella miser, nob., Thes. Conch. pl. 38. f. 111. *Col. testâ ovato-oblongâ, albicante vel lutescente; spirâ pyramidali, anfractibus 6, convexiusculis, anticè castaneo-maculatis, posticis quinque longitudinaliter costatis, antico costato, sed costis dorsalibus anticè evanidis; aperturâ latiusculâ, subrhomboidali, dentibus internis labii externi paucis, parvulis.*

There is a variety with nearly obsolete ribs. Locality unknown. In Mr. Bean's collection and in my own.

Columbella dichroa, nob., Thes. Conch. pl. 40. f. 168, 169.

Col. testâ oblongo-subpyramidali, lævigatâ, albâ, castaneo-sphacelatâ; apice obtuso; anfractibus quinque; aperturâ latâ.

St. Vincent's; Rev. L. Guilding. In my own collection.

Columbella guttata, nob., Thes. Conch. pl. 39. f. 124. *Col. testâ oblongâ, lævi, castaneâ, albo-guttatâ, apice obtuso, violaceo; spirâ longiusculâ, anfractibus 5, subplanulatis, ultimo magno; aperturâ magnâ, latâ, dentibus internis labii externi irregularibus, labio columellari dente unico postico.*

In Mr. Norris's and Mr. Stainforth's collections.

Columbella jaspidea, nob., Thes. Conch. pl. 39. f. 125. *Col. testâ oblongâ, pyramidali, lævigatâ, albicante, fulvo-marmoratâ, apice acuminato, roseo; anfractibus 7, costellatis, tenuissimè decussatim striatis, costellis ultimi anfractûs anticè obsoletis; aperturâ latiusculâ; labio externo extùs incrassato, intùs denticulis nonnullis munito, dente unico anticè propè canalem admoto, labio columellari anticè tubercularum oblongè instructo.*

Found under stones at low water on the island of Ticao, by Mr. Cuming.

Columbella achatina, nob., Thes. Conch. pl. 39. f. 126. *Col. testâ oblongo-turritâ, lævi, pallidè brunneo-marmoratâ, apice decollato; anfractibus 6, convexiusculis, ultimo majori, anticè sulcato, sulcis paucis, inconspicuis; aperturâ brevi, latiusculâ, intùs violascente, labio externo anticè effuso.*

In Mr. Cuming's collection; from Swan River.

Columbella impolita, nob., Thes. Conch. pl. 39. f. 127. *Col. testâ oblongâ, subturritâ, lævi, obscurâ, fulvescente, fasciâ spirali unicâ albidâ; anfractibus 7, subplanulatis; aperturâ brevi usculâ, sinuosâ, denticulis internis labii externi paucis, prominentibus, labio columellari anticè paululùm levato.*

In Mr. Cuming's collection.

Columbella rugulosa, nob., Thes. Conch. pl. 39. f. 131. *Col. testâ obovatâ, rugulosâ, crassâ, violaceo-nigricante, fasciâ anticâ maculisque parvis albidis ornatâ; anfractibus 5, longitudinaliter costatis, tenuiter decussatim striatis, striis unticis fortioribus; aperturâ latiusculâ, dentibus internis labii externi paucis majusculis.*

Gallapagos Islands; H. Cuming.

Columbella atramentaria, nob., Thes. Conch. pl. 40. f. 174. *Col. testâ ovato-acuminatâ, crassâ, medio ventricoso, transversim striatâ, nigrâ; anfractibus 5–6, tenuiter longitudinaliter costatis; aperturâ latâ, labio externo incrassato, internè denticulis subinconspicuis.*

Chatham Island, Gallapagos; G. B. Sowerby's collection.

Columbella ticaonis, nob., Thes. Conch. pl. 39. f. 142. *Col. testâ oblongâ, utráque acuminatâ, medio turgido, pallescente, castaneo-sphacelatâ; anfractibus 6, transversim striatis, suturis levatiusculis; aperturâ oblongâ, labio externo extùs incrassato, margine tenui, denticulis internis paucis, parvulis.*

Found at a depth of seven fathoms in sandy mud, at the island of Ticao, by H. Cuming.

Columbella decussata, nob., Thes. Conch. pl. 39. f. 133. *Col. testâ oblongâ, crassâ, albâ, fusco-marmoratâ; anfractibus* 5, *turgidiusculis, decussatim costatâ; aperturâ oblongâ, subsinuosâ, labio externo albo, crasso, posticè extùs obtusè angulato, margine externo crenato.*

Australia; G. Humphrey.

Columbella blanda, Sol., Thes. Conch. pl. 39. f. 145, 146. *Col. testâ ovato-pyramidali, pallidâ, apice acuto; anfractibus* 8, *lævibus, longitudinaliter undulatim fusco-lineatis, lineis propè suturam dorsalem ultimi anfractûs fortioribus; aperturâ latâ, posticè acuminatâ, labio externo tenuiusculo, extùs turgido, intùs denticulis parvis instructo; canali latiusculo.*

Africa; on the shore. Solander.

Columbella nivea, nob., Thes. Conch. pl. 39. f. 151. *Col. testâ ovato-pyramidali, crassiusculâ, lævi, niveâ, apice acuminato; anfractibus* 8, *primis* 6 *lævigatis, penultimo longitudinaliter costellato, ultimo costato, ad partem dorsalem anticam lævi; aperturâ subangustâ, subsinuosâ, labio externo crasso, intùs subdenticulato, labio columellari anticè levato.*

In Mr. Cuming's collection.

Columbella subulata, nob., Thes. Conch. pl. 40. f. 158, 159. *Col. testâ turrito-pyramidali, lævigatâ, albidâ, epidermide tenui, corneâ, pallescente indutâ; spirâ subulatâ, anfractibus decem, convexiusculis, primis octo lævibus, tribus ultimis posticè transversim striatis, ultimo striato, posticè tumido; aperturâ sinuosâ, albâ, labio externo extùs incrassato, intùs medianè incrassato, denticulato; labio interno incrassato, levato; canali brevi, reflexo.*

In Mr. Norris's collection: locality unknown.

Columbella Puella, nob., Thes. Conch. pl. 40. f. 160, 161. *Col. testâ ovato-pyramidali, spirâ acuminatâ, acutâ, pallidè castaneâ vel brunneâ variegatâ, anfractibus* 9, *longitudinaliter costellatis, lævibus, ultimo anticè transversim striato; suturâ crenulatâ, albâ; canali distincto, extùs transversim sulcato; aperturâ oblongâ, subrhomboideâ, labio columellari uniplicato.*

From Burias; H. Cuming. A variety nearly free from the longitudinal ribs occurs at Catbalonga.

Columbella suffusa, nob., Thes. Conch. pl. 40. f. 166, 167. *Col. testâ oblongâ, crassiusculâ, albicante, maculis liturisque fuscis ornatâ; spirâ acuminatâ, conoidali; anfractibus* 6–7, *longitudinaliter costatis, interstitiis costarum tenuiter transversim striatis; aperturâ latiusculâ.*

Pacific Ocean; Cuming.

Columbella parva, nob., Thes. Conch. pl. 40. f. 170. *Col. testâ oblongâ, pallidâ, fasciâ spirali castaneâ unicâ ornatâ, apice acuminato; anfractibus* 6, *longitudinaliter costatis, decussatim striatis, ultimo anticè propè labium externum variciformatum lævigato,*

supra canalem transversim striato; aperturâ breviusculâ, subsinuosâ, labio columellari levato.

Found under stones at Monte Christi, West Columbia; H. Cuming.

Columbella catenata, nob., Thes. Conch. pl. 40. f. 171. *Col. testâ oblongâ, crassâ, pallidâ, undulatim castaneo-marmoratâ, apice acuminato, obtusiusculo; anfractibus* 6, *longitudinaliter costatis, interstitiis lævibus, ultimo anticè transversim striato; aperturâ latiusculâ, denticulis parvis* 4, *labii columellaris obtusis.*

Locality unknown; Mr. Cuming's collection.

Columbella nigricans, nob., Thes. Conch. pl. 40. f. 172. *Col. testâ oblongâ, nigricante, apice acuminato, anfractibus* 6, *longitudinaliter costatis, interstitiis costarum tenuiter transversim striatis; suturâ distinctâ, crenulatâ, albicante, margine labii externi pallido.*

Gallapagos Islands; Mr. Cuming's collection.

Columbella Dormitor, nob., Thes. Conch. pl. 40. f. 173. *Col. testâ ovato-conoideâ, pallescente, spirâ conicâ, breviusculâ; anfractibus* 6, *transversim sulcatis; aperturâ lævigatâ, margine interno labii externi crenulato.*

St. Vincent's; Rev. L. Guilding. In Mr. Gray's collection.

Columbella Guildingii, nob., Thes. Conch. pl. 40. f. 175, 176. *Col. testâ oblongo-pyramidali, pallescente, brunneo-variegatâ, apice acuminato-subturritâ; anfractibus* 6, *longitudinaliter costatis et transversim striatis; aperturâ longiusculâ, sinuosâ, canali subelongato, extùs transversim sulcato.*

In the British Museum; found at St. Vincent's by the late Rev. Lansdowne Guilding.

Columbella Broderipii, nob., Thes. Conch. pl. 40. f. 178, 179. *Col. testâ oblongo-turritâ, lævi, castaneâ, variè albo-maculatâ et guttatâ; anfractibus* 5, *subventricosis, oblongâ, latiusculâ, labio externo intùs denticulis* 2–3 *obsoletis instructo; anfractu ultimo anticè transversim striato.*

Alboran Island; W. J. Broderip, Esq. In the British Museum.

Columbella Kraussii, nob., Thes. Conch. pl. 40. f. 180, 181. *Col. testâ ovato-oblongâ, lævi, albicante, lineis castaneis undulatis signatâ; anfractibus* 5–6, *subventricosis, longitudinaliter costellatis, costellis distantibus, interstitiis lævibus; aperturâ latâ; canali brevissimo.*

In the British Museum; found at Natal by Dr. Krauss.

Columbella monilifera, nob., Thes. Conch. pl. 40. f. 177. *Col. testâ turritâ, albâ, maculis irregularibus brunneis pictâ, spirâ acuminatâ; anfractibus* 7, *longitudinaliter costatis et transversim sulcatis, series tres posticas et seriem unicam costellarum granuliferarum anticam efformantibus; aperturâ brevi, latiusculâ.*

From the West Indies; the late G. Humphrey.

Columbella pusilla, nob., Thes. Conch. pl. 40. f. 182, 183. *Col. testâ ovatâ, lævi, albicante, lineis pallidè brunneis pictâ; spirâ subacuminatâ; anfractibus* 5–6, *subventricosis; aperturâ latiusculâ,*

labio externo crassiusculo, intùs obsoletè denticulato; labio interno intùs tuberculo obtuso instructo; canali brevi.

St. Vincent's; the late Rev. L. Guilding.

Columbella atomella, Ducl., Thes. Conch. pl. 40. f. 184, 185. *Col. testâ oblongâ, albicante, nonnunquàm pallidè castaneo-unifasciatâ, spirâ acuminatâ; anfractibus* 6, *longitudinaliter costatis; suturâ crenatâ; ultimo anfractu anticè lævi, supra canalem transversim sulcato; aperturâ angustâ.*

West Indies; Rev. L. Guilding.

March 26.—The Right Hon. William Sturges Bourne in the Chair.

A communication was made by Dr. Falconer, conveying the substance of a paper by Capt. Cautley and himself on the osteological characters and palæontological history of the *Colossochelys Atlas*, a fossil tortoise of enormous size, from the tertiary strata of the Sewalik hills in the north of India—a tertiary chain apparently formed by the detritus of the Himalaya mountains.

A great number of huge fragments, derived from all parts of the skeleton except the neck and tail, were exhibited on the table, illustrative of a diagram by Mr. Scharf of the animal restored to the natural size.

The communication opened with a reference to the reptilian forms discovered in the fossil slate, among which colossal representatives have been found of all the known tribes, such as the *Iguanodon*, *Megalosaurus*, *Labyrinthodon*, &c., besides numerous forms of which no living analogues exist, such as the *Enaliosaurian* reptiles and *Pterodactyles*. No fossil *Testudinata* remarkable either for size or deviation from existing forms, have hitherto been found in the fossil state. The *Colossochelys* supplies the blank in the first respect, while it differs so little from the land-tortoises in the general construction of its osseous frame as hardly to constitute more than a subgenus of *Testudo*.

The plastron or sternal portion of the shell affords the chief distinctive character. The episternal portion in the adult is six and a half inches thick, and contracted into a diameter of eight inches, bifid at the apex, and supplied with a thick cuneiform keel on its inferior side: this keel constitutes one of the principal features in the fossil. The entosternal portion exhibits exactly the form of *Testudo*, the same being the case with the xiphiosternal or posterior portion. The plastron in the adult animal was estimated to be nine feet four inches long.

The carapace or buckler of the shell coincides exactly with the general form of the large land-tortoises, of which it exhibits only a magnified representation, flattened at the top and vertical at the sides, with the same outline and recurved margin. The shell was estimated to have been twelve feet three inches long, eight feet in diameter, and six feet high.

The extremities were described as constructed exactly as in the land-tortoises, in which the form of the femur and humerus is marked by peculiar characters. These bones in the fossil were of a huge

size, corresponding to the dimensions of the shell. The ungueal bones indicated a foot as large as that of the largest Rhinoceros. The humerus was more curved, and the articulating head more globular and deeper in the fossil, from which it was inferred that it had a stronger articulation, greater rotation, and that the *Colossochelys* was enabled to bring its anterior extremities more under its weight than is the case with existing tortoises.

The affinities with *Testudo* shown in the shell and extremities were found to hold equally good in the construction of the head, of which a comparatively small-sized specimen, inferred to have belonged to a young or half-grown *Colossochelys*, was exhibited. The head of the adult to correspond with the dimensions of the shell, and according to the proportions furnished by a large *Testudo Indica*, was deduced to have been two feet long.

There were no ascertained cervical vertebræ to afford direct evidence as to the length of the neck, which was constructed in the diagram relatively to the proportions of *Testudo Indica*. The entire length of the *Colossochelys Atlas* was inferred to have been about eighteen feet, and that it stood upwards of seven feet high.

The generic name given by the discoverers has reference to the colossal size of the fossil (κολοσσὸς et χέλυς), and the specific one to its fitting representation of the mythological tortoise that sustained the world, according to the systems of Indian cosmogony.

Mr. Gould exhibited a series of Birds from Australia, collected partly by himself and partly by Mr. Gilbert, viz.:—

Fam. Columbidæ.

Geopelia placida. *Geop. facie et gutture cinereis; occipite, dorso alisque e cinereo-fuscis; singulis plumis ad apicem nigerrimo fasciatis, alulis spuriis primariisque saturatè fuscis, humeris subtùs castaneis, pectore, lateribus, et nuchâ cinereis lineis angustis nigris crebrè fasciatis, et lateribus vinaceis.*

Face and throat grey; occiput, back and wings ashy brown; each feather with a band of deep velvety black at the extremity; spurious wings and primaries dark brown; under surface of the shoulders chestnut; chest, sides and back of the neck grey, crossed by numerous narrow bands of black; abdomen and flanks vinous; four centre tail-feathers ashy brown, the remainder black, largely tipped with white; irides light ash-grey; bill and orbits bright greyish blue, becoming much paler before and behind the eye; frontal scales of tarsi and feet dark greenish grey; remainder of the legs and feet reddish flesh-colour.

Total length, $7\frac{3}{8}$ inches; bill, $\frac{5}{8}$; wing, $3\frac{7}{8}$; tail, $3\frac{4}{8}$; tarsi, $\frac{4}{8}$.

Hab. Port Essington.

This and the next species are very nearly allied, but on comparison of numerous individuals I find that size invariably points out the locality from which they have been procured; the larger birds (*G. tranquilla*) being an inhabitant of the interior of New South Wales, and the smaller (*G. placida*) of the north coast; besides which, the

bands crossing the chest are broader and more distinct in the latter than in the former.

Geopelia tranquilla. *Geop. facie et gutture pallidè cinereis, occipite dorso alisque e cinereo-fuscis, singulis plumis ad apicem angustè nigerrimo fasciatis; alulis spuriis, primariisque saturatè fuscis, pectore, lateribus, et nuchâ pallidè cinereis, lineis angustis nigris crebrè notatis, abdomine et lateribus pallidè vinaceis, abdomine medio crissoque albis; humeris subtùs castaneis.*

Face and throat pale grey; occiput, back and wings ashy brown, each feather bounded at the end with a narrow band of deep velvety black; spurious wing and primaries dark brown; chest, sides and back of the neck pale grey, crossed by numerous narrow, irregular bands of black; abdomen and flanks pale vinous; centre of the abdomen and under tail-coverts white; under surface of the shoulder deep chestnut; four centre tail-feathers greyish brown, passing into black at the tip; the lateral tail-feathers black, largely tipped with white; irides transparent bluish white; base of bill and nostrils light blue; tip of the bill bluish black; naked skin of the orbits deeply wrinkled and of a beautiful light greenish blue; frontal scales of the tarsi and toes dark purple; hind part of the legs flesh-colour.

Total length, $8\frac{3}{4}$ inches; bill, $\frac{5}{8}$; wing, 4; tail, $4\frac{3}{4}$; tarsi, $\frac{5}{8}$.

Hab. Liverpool plains and banks of the Namoi, interior of New South Wales.

Family Rallidæ.

Genus Eulabeornis.

Gen. char.—*Rostrum* capite longius, ferè rectum, et leviter incurvum, lateraliter compressum; naribus elongatis, apertis, singulis in sinu per mandibulæ tres ferè partes a basi excurrente positis. *Alæ* paulò breves atque debiles, valdè rotundatæ; tertiariis elongatis, ferè ad apicem alæ. *Tarsi* paulò longi, et robustiores quàm in genere 'Rallus;' digitis attamen brevioribus. *Cauda* longa, cuneiformis, pogoniis laxis et effusis.

Eulabeornis castaneoventris. *Eul. capite et collo cinereis; corpore superiore in toto olivaceo; pectore et corpore inferiore e cinereo-castaneis.*

Head and neck ash-grey; all the upper surface, wings and tail olive; breast and all the under surface greyish chestnut; bill yellow at the base, horn-colour at the tip; legs and feet brown.

Total length, 19 inches; bill, $2\frac{1}{4}$; wing, $9\frac{1}{2}$; tail, 6; tarsi, $2\frac{1}{2}$.

Hab. North coast of Australia.

The "*Morduggera*" of the aborigines at Port Essington.

Family Procellaridæ.

Puffinus carneipes. *Puff. castaneo-niger; rostro e carneo albo, culmine apiceque fuscis; pedibus flavescenti-carneis.*

All the plumage chocolate-black; bill fleshy white; culmen and tips of the mandibles brown; legs, feet and membranes yellowish flesh-colour.

Total length, 15 inches; bill, $1\frac{3}{4}$; wing, 12; tail, 5; tarsi, 2; middle toe and nail, $2\frac{1}{2}$.

Procellaria Solandri. *Proc. capite, nuchâ, humeris, primariis et caudâ saturatè fuscis; dorso, alarum caudæque tectricibus e plumbeo-cinereis, plumis fusco marginatis; facie, corporeque subtùs fuscis, abdomine cinereo lavato.*

Head, back of the neck, shoulders, primaries and tail dark brown; back, wing-coverts and upper tail-coverts slate-grey, each feather margined with dark brown; face and all the under surface brown, washed with grey on the abdomen; bill, tarsi and membranes black.

Total length, 16 inches; bill, $1\frac{3}{4}$; wing, 12; tail, $5\frac{1}{2}$; tarsi, $\frac{3}{4}$; middle toe and nail, $2\frac{3}{8}$.

Procellaria leucoptera. *Proc. vertice, corpore superiore, alisque e plumbeo nigris; caudâ e plumbeo-cinereâ; facie, gutture, corpore inferiore, rectricum pogoniis internis ad basim, lineâque humerali albis; tarsis, et membranis interdigitalibus per dimidium basale e carneo-albis.*

Crown of the head, all the upper surface and wings dark slaty black; tail slate-grey; greater wing-coverts slightly fringed with white; face, throat, all the under surface, the base of the inner webs of the primaries and secondaries, and a line along the inner edge of the shoulder, pure white; bill black; tarsi and basal half of the interdigital membrane fleshy white; remainder of the toes and interdigital membrane black.

Total length, 13 inches; bill, 1; wing, $8\frac{1}{2}$; tail, 4; tarsi, $1\frac{1}{8}$; middle toe and nail, $1\frac{3}{8}$.

Aptenodytes undina. *Apt. corpore superiore, lateribus, alisque supernè nitidè cærulescentibus, per plumas singulas lineâ nigrâ longitudinali (latiore in plumis dorsalibus); corpore inferiore alisque subtùs et ad marginem, rectricumque pogoniis internis albis.*

The whole of the upper surface, flanks and upper surface of the wings glossy light blue, with a narrow stripe of black down the centre of each feather, the black mark being broadest and most conspicuous on the back; all the under surface of the body, under side, and the inner margin of the upper side of the wing and inner webs of the tail-feathers silky white; bill reddish brown beneath, black above; feet yellowish white.

Total length, $13\frac{1}{2}$ inches; bill, $1\frac{1}{4}$; tarsi, $\frac{3}{4}$.

Hab. Van Diemen's Land.

This is less than *Ap. minor*, to which it is nearly allied.

For the fine specimen here described I am indebted to Ronald C. Gunn, Esq., who procured it at Circular Head, Van Diemen's Land.

April 9.—William Yarrell, Esq., Vice-President, in the Chair.

A paper by Mr. Sylvanus Hanley was read, containing the following descriptions of new species of the genus *Tellina*, chiefly collected by H. Cuming, Esq. in the Philippine Islands and Central America:—

Tellina Cumingii*. *Tel. testâ elongato-oblongâ, subæquilaterali,*

* In my former papers I have used the terms posterior and anterior in

solidâ, compressiusculâ, vix nitidâ, albidâ aut flavescente, maculis aut strigis lineisve brunneis aut fusco-purpurascentibus radiatâ, concentricè sulcatâ; sulcis anticè confertis, subimbricatis, posticè sublamellosis remotiusculis; margine ventrali convexo, utrinque sursùm acclinante; dorsali utrinque subdeclivi, anticè convexiusculo, posticè subrecto, subincurvato, subdentato; latere postico attenuato, rostrato, paululùm breviore, ad extremitatem biangulato; costâ umbonali valdè prominente; ligamento inconspicuo; superficie internâ albidâ aut flavidâ; dentibus lateralibus validis, subæquidistantibus. Long. 0·95; lat. 2·40 poll.

Hab. Guacomayo, Central America; in coral sand.

Intermediate between *Spengleri* and *Mexicana*.

Tellina Rastellum. *Tel. testâ elongatâ, convexiusculâ, æquilaterali, solidâ, flavidâ, pallidè roseo radiatâ, anticè sulcatâ, posticè squamosâ; squamis erectis, lamellosis, in iisdem seriebus cum sulcis concentricis, ordinatis; margine ventrali vix convexiusculo; dorsali utrinque paululùm declivi, anticè vix convexiusculo, posticè recto aut subincurvato; latere postico attenuato, subrostrato, ad extremitatem obliquè biangulato; extremitate anticâ rotundatâ; ligamento, et costâ umbonali, conspicuis; superficie internâ albidâ, umbones versùs aurantio utrinque fucatâ; dentibus lateralibus validis, subæquidistantibus.* Long. 1·61; lat. 3·61 poll.

Hab. Zanzibar. Mus. Cuming, Stainforth, &c.

A species frequently confused with *pulcherrima*, but much more elongated, the sulci stronger, and the scales entirely absent from the anterior side.

Tellina asperrima. *Tel. testâ oblongo-ellipticâ, convexiusculâ, solidiusculâ, flavidâ aut incarnatâ, roseo-radiatâ, totâ superficie externâ, squamis asperrimâ; squamis anticè semilunatis, posticè (et præsertim supra costam umbonalem distinctam) spinosis; margine ventrali medio subrecto flexurâ distinctâ; dorsali utrinque subdeclivi et paululùm convexiusculo; latere antico breviore; extremitate posticâ subbiangulatâ, attenuatâ; dentibus lateralibus magnis, antico approximato.* Long. 1·0; lat. 1·85 poll.

An unique specimen, in the cabinet of Mr. Cuming; found by him at Sual, province of Pangasinan, isle of Luzon (sandy mud, six fathoms). Allied to *pulcherrima*.

Tellina Jubar. *Tel. testâ* T. virgatæ *affinis, sed magis triangulari, altiore, minus elongatâ; rubro-purpureâ, radiis albis aut albidis ornatâ; margine ventrali subarcuato; dorsali utrinque decliviore; superficie internâ albidâ, aut coloribus externis fucatâ.* Long. 1·65; lat. 2·50 poll.

Hab. ——? Mus. Cuming, Sowerby, &c.

Tellina verrucosa. *Tel. testâ oblongo-elongatâ, solidâ, compressâ; aut flavidâ, rubro-purpureo radiatâ, aut pallidè rosea,*

the Lamarckian sense of the words; but as I find this is contrary to the practice of the other writers in these Proceedings, for the sake of uniformity I now conform to *their* phraseology.

radiis subalbidis angustis, zonisque saturatioribus, ornatâ; valvulâ alterâ, undique (natibus excipiendis) verrucosâ; alterâ, medio concentricè sulcatâ, lateribus solùm verrucosâ; verrucis ellipticis, aut semilunatis, in seriebus vix interruptis, concentricè ordinatis; margine ventrali anticè subarcuato, posticè sursùm acclinante; dorsali anticè convexiusculo et vix subdeclivi, posticè subrecto, subdeclivi; latere antico longiore, rotundato; extremitate posticâ attenuatâ, subrostratâ, obliquè subbiangulatâ; ligamento haud prominente; flexurâ ventrali costâque umbonali, conspicuis; dentibus lateralibus magnis, æquidistantibus. Long. 0·75; lat. 1·50 poll.

Hab. Corregidor, bay of Manila.

General shape of *T. crucigera*, but in sculpture quite distinct.

Two specimens only of this rare Tellen are as yet known, and both of them in the cabinet of H. Cuming, Esq.

Tellina Guildingii. *Tel. testâ oblongâ, tenui, compressâ, subæquilaterali, albidâ, radiis aurantio-roseis, zonisque albido-roseis, ornatâ; sulcis exilibus, confertis, concentricè exaratâ; margine ventrali subrecto, medio subretuso; dorsali utrinque declivi, et vix convexiusculo; latere postico paululùm breviore, attenuato; extremitate posticâ infernè angulatâ, anticâ rotundatâ; natibus acutis; costâ umbonali et flexurâ ventrali inconspicuis; ligamento prominente; dentibus lateralibus magnis, æquidistantibus.* Long. 0·70; lat. 1·30 poll.

Hab. West Indies. Mus. Metcalfe, Walton.

Possesses the general appearance of a *Psammobia*, and belongs to that section of *Tellinæ* of which *virgata* is the type.

Tellina rubescens. *Tel. testâ* T. striatæ *et* T. puniceæ *simillimâ; ab hâc autem differt, testâ tenuiore anticæ emarginationis experte; ab illâ, natibus obtusioribus, et extremitate posticâ minus attenuatâ; ab utroque, superficie nitidissimâ, ligamento infosso, margineque ventrali convexiore et utrinque subæqualiter declivi; sulcis in utrâque valvulâ posticè obsoletis; dentibus ut in* T. puniceâ, *sed minimis, inconspicuis.* Long. 1·25; lat. 1·75.

Hab. Panama and Tumbez; in sandy mud.

Tellina regia. *Tel. testâ oblongâ, tenui, compressiusculâ, subinæquivalvi, subæquilaterali, nitidissimâ, pellucidâ, intus extusque roseo-purpurascente, concentricè sulcatâ; sulcis remotis, alterâ in valvulâ posticè evanescentibus; margine ventrali subrecto, medio subretuso; dorsali utrinque subæqualiter declivi, posticè subrecto; latere antico paululùm breviore, ad extremitatem obtusè rotundato; extremitate posticâ supernè angulatâ, attenuatâ; costâ umbonali et flexurâ ventrali obsoletis; ligamento prominulo; dentibus ut in* T. puniceâ. Long. 1·0; lat. 1·80 poll.

Hab. Real Llejos, Central America; in coarse sandy mud, seven fathoms.

This species forms one of that group of which *punicea* is the type. Though closely allied to that species, its transparency, the more distant sulci, and its deep purplish-red colouring suffice to distinguish it.

Tellina eburnea. *Tel. testâ oblongâ, opacâ, solidâ, inæquivalvi, convexâ, nitidâ, albidâ, inæquilaterali, concentricè sulcatâ; sulcis profundis, remotis (alterâ in valvulâ, nonnunquam posticè evanescentibus); margine ventrali convexiusculo, anticè sursùm acclinante; dorsali anticè subrecto, leviterque declivi, posticè recto subitòque declivi; latere postico multùm breviore, subcuneiformi; lineis erectis obliquis, aream nymphalem et analem rugantibus; ligamento brevi, prominente; flexurâ ventrali costâque umbonali subobsoletis; superficie internâ candidâ; dentibus lateralibus, ut in* T. puniceâ. Long. 0·90; lat. 1·50 poll.

Hab. Tumbez, Peru; in soft sandy mud, five fathoms.

Allied to *punicea*, but easily distinguished from that and any other allied species by the peculiar elevated sulci on the dorsal areas.

Tellina Prora. *Tel. testâ subtrigonâ, ovali, solidâ, convexiusculâ, subæquilaterali, nitidâ, extus intusque pallidè rosea, aut sublævigatâ, aut concentricè et tenuissimè striatâ; margine ventrali convexo; dorsali utrinque valdè et subæqualiter declivi, subrecto; extremitate posticâ acuminatâ; flexurâ ventrali costâque umbonali subobsoletis; ligamento prominulo; dentibus lateralibus magnis, antico approximato.* Long. 1·20; lat. 1·80 poll.

Hab. Porto St. Elena, West Columbia; sandy mud, six fathoms; and Salango, West Columbia, sandy mud, nine fathoms.

Its extremely delicate concentric striæ and acuminated extremity separate it from most of the allied species. It belongs to that group which contains *punicea*.

Tellina laceridens. *Tel. testâ oblongo-subtrigonâ, solidâ, opacâ, subæquilaterali, nitidissimâ, convexiusculâ, albâ (intus candidâ), supernè lævigatâ, infernè concentricè et confertim striatâ; margine ventrali convexiusculo; dorsali utrinque convexiusculo, et subæqualiter declivi; extremitate anticâ rotundatâ (plerumque subattenuatâ), posticâ rotundato-acuminatâ; costâ umbonali et flexurâ ventrali inconspicuis; ligamento magno, elongato, prominente; dentibus primariis laceratis, antico laterali subapproximato, postico laterali, minore, remoto.* Long. 1·50; lat. 2·50 poll.

Hab. Tumbez, Peru; soft sandy mud, five fathoms.

Var. *Testâ magis trigonâ, sulcis confertis, undiquè exaratâ.* Long. 1·20; lat. 1·80 poll.

Hab. Chiriqui, West Columbia; sandy mud, three fathoms.

The ragged primary teeth, the large and elongated ligament, and the either smooth or *closely* sulcated surface, distinguish it from any of the allied species.

Tellina princeps. *Tel. testâ oblongo-ellipticâ, æquilaterali, solidâ, compressâ, nitidiusculâ, intus extusque roseo-purpurascente, concentricè sulcatâ; striis exilibus, profundis, radiantibus, sulcos confertos utrinque (et alterâ in valvulâ undique) decussantibus; margine ventrali subrecto, dorsali utrinque leviter et æqualiter subdeclivi; extremitate posticâ, obtusissimè angulatâ; flexurâ ventrali costâque umbonali obsoletis; ligamento prominente; dente laterali antico approximato, postico parvo, remoto, inconspicuo.* Long. 2; lat. 3·50 poll.

Hab. Tumbez, Peru; soft sandy mud, five fathoms.

Although not easily confused with any of that section (with two lateral teeth) to which it belongs, it closely resembles *Tellinides purpurascens*.

Tellina Sowerbii. *Tel. testâ subelliptică, subinæquivalvi, tenui, compressâ, lævigatâ, politâ, candidâ; margine ventrali arcuato, posticè sursùm acclinante; dorsali anticè vix paululùm declivi, convexiusculo, posticè paululùm declivi, propè nates subincurvato, deindè convexo; latere antico longiore, subproducto, postico rotundato-acuminato; ligamento parvo, angustissimo, infosso; flexurâ ventrali costâque umbonali subinconspicuis; superficie internâ albidâ, plerumque aurantio tinctâ; dentibus lateralibus tenuibus, subæquidistantibus.* Long. 2; lat. 3·30.

Hab. ——? Mus. Sowerby, Hanley.

Bears a slight resemblance to the *acuta* of Wood.

Tellina pudica. *Tel. testâ parvâ, solidâ, ovato-subtrigonâ, subæquilaterali, nitidâ, candidâ, sublævigatâ, tenuissimè concentricè striatâ; margine ventrali anticè arcuato, posticè subitò sursùm acclinante; dorsali utrinque valdè declivi, anticè convexo, posticè elongato, subrecto; latere antico paululùm breviore, subventricoso, rotundato; postico compresso, rostrato; extremitate posticâ subacuminatâ; natibus prominentibus; flexurâ ventrali costâque umbonali subinconspicuis; ligamento minimo, infosso; superficie internâ politâ; dentibus lateralibus distinctis, subapproximatis, subæquidistantibus.* Long. 0·30; lat. 0·40 poll.

Hab. Catbalonga, isle of Samar; ten fathoms, soft mud.

A stout little shell, possessing the general contour of a *Neæra*, and not easily to be confused with any species of this genus.

Tellina nux. *Tel. testâ obovali, subinæquivalvi, subæquilaterali, tenui, convexâ aut subventricosâ, nitidâ, sublævigatâ aut infernè concentricè substriatâ, intus extusque albidâ, umbonibus hyalinis et fulvis; margine ventrali subarcuato, dorsali utrinque convexo, satis et æqualiter declivi; extremitate posticâ obtusâ, attenuatâ; ligamento angustissimo, infosso; natibus obtusis; flexurâ distinctâ; costâ umbonali inconspicuâ; dentibus lateralibus distinctis, antico paululùm propinquiore.* Long. 0·50; lat. 0·75 poll.

Hab. St. Nicholas, Zebu; sandy mud, four fathoms.

More oval than the three succeeding closely allied species.

Tellina pinguis. *Tel. testâ parvâ, rotundato-ovali, tenui, subinæquivalvi, subæquilaterali, nitidâ, convexâ aut subventricosâ, intus extusque albidâ (rarius incarnatâ), lævigatâ (nonnunquam concentricè substriatâ); margine ventrali arcuato, dorsali utrinque convexo et subæqualiter declivi; extremitate posticâ obtusâ; flexurâ distinctâ; natibus minimis; costâ umbonali ferè obsoletâ; ligamento angustissimo, infosso; dentibus ut in* T. nuce. Long. 0·50; lat. 0·60 poll.

Hab. St. Nicholas, Zebu.

By its more orbicular outline it may be distinguished from *nux* and *casta*. It is still more closely allied to *robusta*, but its tenuity,

more obtuse hinder extremity, and the greater convexity and less sudden slope of the dorsal edges, suffice for its separation.

Tellina robusta. *Tel. testâ parvâ, rotundato-subtrigonâ, solidâ, subinæquivalvi, subæquilaterali, ventricosâ, nitidâ, aut albo-flavescente, aut pallidè rosaceâ, sublævigatâ (plerumque inferius remotè substriatâ); margine ventrali valdè arcuato, dorsali utrinque subrecto et valdè declivi; latere postico attenuato, ferè subrostrato, ad extremitatem acuminato; ligamento angustissimo, infosso; natibus distinctis, prominentibus, et rectè incurvatis; umbonibus tumidis; flexurâ distinctâ; costâ umbonali ferè obsoletâ; lunulâ parvâ; superficie internâ, plerumque sub umbonibus, flavidâ aut roseâ; dentibus ut in* T. nuce. Long. 0·70; lat. 0·80 poll.

Hab. Isle of Annaa, South Seas, and isle of Burias, Philippines; sandy mud, low water.

Is closely allied to *nux*, *pinguis* and *casta*, but of a stouter texture even in the youngest individuals. The ligamental edge being nearly straight, easily separates it from *pinguis*, where it is decidedly convex.

Tellina casta. *Tel. testâ obovali, tenuissimâ, subinæquivalvi, subæquilaterali, pellucidâ, convexâ, nitidâ, extus intusque candidâ, lævigatâ; margine ventrali maximè arcuato; dorsali utrinque subrecto, subæqualiter satisque declivi; extremitate posticâ angustâ, biangulatâ; ligamento angustissimo, subinfosso; natibus acutis; flexurâ ventrali costâque umbonali distinctis; dentibus ut in* T. nuce. Long. 0·36; lat. 0·48 poll.

Hab. Singapore; sandy mud.

Bears some resemblance to *T. nux*, but the shape is less broad, the ventral edge decidedly arcuated, the dorsal edges less convex and shorter, and the umbones colourless.

Tellina Discus. *Tel. testâ* T. Remiei *simillimâ, sed subobliquâ et sulcis concentricis valdè irregularibus, vixque continuis; natibus haud rectè incurvatis; margine postico dorsali elevatiore, antico dorsali, prope nates prominulas subincurvato; umbonibus lævigatis; extremitate posticâ angulatâ.* Long. 2·75; lat. 3 poll.

Hab. Isle of Mindanao; on reefs, in coarse sand.

Tellina cyrenoidea. *Tel. testâ suborbiculari, solidiusculâ, inæquivalvi, valdè inæquilaterali, subventricosâ, sordidè albâ (intus, sub umbonibus, purpureâ), concentricè costellatâ; striis minutis obliquè radiantibus, costellas confertas posticè decussantibus; margine ventrali arcuato; dorsali utrinque valdè et subrectè declivi, anticè brevi, posticè longiore; latere antico breviore, obtusè rotundato; extremitate posticâ obtusâ, paululùm attenuatâ; natibus prominentibus; lunulâ distinctâ; ligamento infosso; flexurâ costâque umbonali obsoletissimis; dentibus lateralibus parvis, distinctis, subæquidistantibus.* Long. 0·60; lat. 0·70.

Hab. St. Nicholas, isle of Zebu; sandy mud, low water.

In external appearance bears much resemblance to a *Cyrena*.

BOTANICAL SOCIETY OF LONDON.

Sept. 6, 1844.—J. Reynolds, Esq., Treasurer, in the Chair.

Mr. T. Ingall presented a specimen of *Teucrium Botrys* found in August last in a stony field at the back of Box Hill, between Brockham and the upper part of Headley Lane.

Read "Dr. Taylor's descriptions of some new Musci and Lichenes from the Australian colonies, namely, *Dicranum Menziesii, Bryum leptothecium, Bartramia tenuis, Hypnum excavatum, Usnea scabrida* and *Parmelia tubularis*:" all of Taylor's MSS.

Oct. 4.—J. Reynolds, Esq., Treasurer, in the Chair.

Read "A General Description of the Botany, Climate and Physical Geography of the neighbourhood of Embleton in Northumberland; drawn up by Robert Embleton, Esq. in illustration of a Local Herbarium of the district, collected for the Society by the same gentleman."

Nov. 1.—J. Reynolds, Esq., Treasurer, in the Chair.

Read "Notice of the discovery of *Galium Vaillantii* near Saffron Walden, Essex, by G. S. Gibson, Esq." Specimens were presented.

Nov. 29.—Eighth Anniversary Meeting.

J. E. Gray, Esq., F.R.S., President, in the Chair.

From the report of the Council it appeared that seventeen members had been elected since the last Anniversary, and that the Society now consisted of 173 members; at which a ballot took place for the Council for the ensuing year, when the Chairman was re-elected President, and he nominated E. Doubleday, Esq., F.L.S., and Dr. Bossey, Vice-Presidents. Mr. J. Reynolds, Mr. G. E. Dennes, and Mr. T. Sansom, were respectively re-elected Treasurer, Secretary and Librarian.

Dec. 6.—J. Reynolds, Esq., Treasurer, in the Chair.

Dr. Dewar presented specimens of *Carduus setosus*, discovered by himself in July last, three miles from Dunfermline, Fifeshire. This being a plant of Eastern Europe, and apparently hitherto unknown on the western coasts, there seems much probability that the seed has been accidentally imported from Russia. Its nearest ally in Britain is *C. arvensis*.

Mr. Thomas Bentall presented specimens of *Œnanthe fluviatilis* (of Coleman), collected by himself in the river, near Halstead, Essex, in July.

The Rev. W. R. Crotch presented specimens of *Helianthemum Breweri* (Planchon), collected in the long-known locality of Holyhead Mountain, Anglesea. This species has hitherto been confused with *H. guttatum* by all British botanists, but is figured as an undescribed species in the 'London Journal of Botany' for November 1844, and explanations are given in the succeeding number of the same periodical. The true *H. guttatum*, from the South of France,

was shown to be quite a different plant, by specimens laid before the Society.

Mr. Hewett Watson called the attention of the Society to a series of specimens in illustration of the three species of *Œnanthe* described by Mr. Ball, in the 'Annals of Natural History,' under the names of *pimpinelloides*, *Lachenalii*, and *silaifolia*. Mr. Watson stated that these species had been confused and misnamed by Hudson and Smith, and that most succeeding botanists had in consequence been misled about them; the error and confusion being greatly increased by the want of root and fruit on specimens collected for herbaria. He considered that Mr. Lees was the first English botanist who correctly understood the true *pimpinelloides*. Mr. Babington next rightly determined the *Lachenalii*; and lastly, Mr. Ball, contrasting these two plants with the *peucedanifolia* of Smith, showed clearly enough that three indigenous species had been confused into two only, on account of no single botanist being sufficiently acquainted with all three. Specimens sent to the Society by the Rev. A. Bloxam, Mr. Lees, Mr. G. S. Gibson and Mr. Thwaites, with others collected by Mr. Watson himself, illustrated the three species clearly; except that the early radical leaves and perfectly mature fruit of Smith's *peucedanifolia* were still wanting. Mr. Watson, however, suspected that Mr. Ball's name of *silaifolia* was equally incorrect as Smith's name of *peucedanifolia*, and not knowing any other described species to which Smith's plant could be referred, he adopted the name of *Œnanthe Smithii*; to be temporary or permanent, as occasion might require.

The following is an abbreviation of the specific characters proposed for the species:—

1. *Œ. pimpinelloides*, Linn. Tubers oval or subspherical, connected with the stem by a slender peduncle. Fruit cylindrical, about as broad as the calyx, callous at the base, not contracted.

2. *Œ. Lachenalii*, Gmel. Tubers elongated and slender, clavate, fusiform or subcylindrical, gradually enlarging from the base of the stem, without any distinct peduncle. Fruit oblong or turbinate, broader than the calyx, contracted, and without callosity at base.

3. *Œ. Smithii*, H. Wats. Tubers short and thick, clavate, fusiform or oblong, sessile at the base of the stem. Fruit cylindrical, scarcely so broad as the calyx, callous at the base, not contracted.

GEOLOGICAL SOCIETY.

May 29.—The Rev. Professor Sedgwick read the conclusion of his "Memoirs on the Geology of North Wales."

June 12.—The following papers were read:—

1. "On Fluorine in Bones, its Source and its Application to the ascertainment of Geological Time." By Mr. J. Middleton.

The author having analysed and determined the amount of fluoride of calcium in recent bone, in that of an ancient Greek, of a mummy, and in the bones of fossil vertebrata from the Siwalic hills, found the proportions increase according to the age. He instituted a se-

ries of experiments on aqueous deposits of different kinds and ages, and found fluorine also present in them, with a single exception. He refers its presence in bones to deposition from fluids, and hence accounts for its great abundance in fossil bones, which had long been exposed to aqueous infiltration.

2. "On the Cliffs of Northern Drift on the Coast of Norfolk between Weybourne and Happisburgh." By Mr. J. Trimmer.

The author describes such changes as have occurred along the line of cliffs between Weybourne and Happisburgh since Mr. Lyell's visit in 1840. He gives an account of the present state of the pinnacle of chalk at Old Hythe point, and holds with Mr. Lyell, that it is separated from the fundamental chalk by the ferruginous breccia of the crag. The southern mass of chalk near Trimmingham has been greatly reduced. The author's observations lead him to conclude that the till and freshwater deposit between Mundesley and Trimmingham are so interlaced as to indicate that they were in part contemporaneous. He regards the northern drift containing shells as having been transported on ice, but as differing materially from ordinary raised beaches. Mr. Trimmer concludes from the phænomena exhibited at Happisburgh, that the land on which the elephant and hippopotamus lived was submerged beneath an icy sea, and that there was an antecedent conversion of a sea-bottom, the Norwich crag, into a terrestrial surface.

3. A letter was read from Mr. Jeffreys of Swansea, to the Rev. Dr. Buckland, describing several raised sea-bottoms, forming platforms on the shores of Loch Carron and the neighbouring coast of Scotland, some of them fifty feet and more above high-water mark, containing shells similar to those found living in the neighbouring sea.

June 26.—The following papers were read:—

1. "Notice of the Tertiary Deposits in the South of Spain." By Mr. Smith of Jordan Hill.

The author has found a tertiary deposit bordering the Bay of Gibraltar. This agrees in its fossils with those observed by Colonel Silvertop in Murcia and Granada. Mr. Smith has found similar beds at Cadiz, and between Xeres and Seville. All these deposits agree with those of Malta and Lisbon, and belong to a great expanse of miocene tertiary, which runs from Greece to the Straits of Gibraltar, and the shores of Portugal, and from Malta to Vienna.

2. "On the Stonesfield Slate of the Cotteswold Hills." By Mr. Buckman and the Rev. P. B. Brodie.

The Stonesfield slate in the Cotteswold range occupies an area of more than fifty miles. It is identical in lithological and palæontological characters with that at Stonesfield. It is so intermixed with as scarcely to be separable from the ragstone, and hence the authors conclude that it is a part of the great oolitic formation, and was deposited by the same sea in which the great oolite itself was formed, and owed its origin to certain mixed conditions arising from the influx of rivers into an ocean interspersed with numerous scattered islands, abounding with a luxuriant vegetation, and inhabited by numerous terrestrial animals; which view, they hold, is borne out

by the quantity of plants which occur throughout the Stonesfield slate beds, and also from the relics of land animals, such as the Didelphis and Pterodactylus. The clays which lie upon the slate may possibly represent the Bradford clay, or if not, are the equivalents of certain clay beds, containing Apiocrinites, which in Wiltshire separate the firestone from a lower stratum of freestone of a coarser texture.

3. "Description of a Fossil Ray from Mount Lebanon." By Sir Philip Grey Egerton, Bart., M.P.

The author describes a new and most remarkable fossil fish brought from Syria by Capt. Graves, R.N. It is a true ray, much resembling those of the present period, but entirely surrounded by a broad flexible cartilagino-membranous fin. The skin appears to have been smooth, and there are no traces of dermal spines, tubercles, or defensive weapons. From its apparent helplessness, Sir Philip Egerton conjectures that it was probably armed like the torpedo, to which it is in some respects allied, with an electrical apparatus. He names it *Cyclobatis oligodactylus*.

4. "Description of some New Species of Fossil Fish, from the Oxford Clay of Christian-Malford." By Sir Philip Grey Egerton, Bart., M.P.

Three new species are described in this communication, the *Lepidotus macrochirus*, the *Leptolepis macrophthalmus*, and the *Aspidorhynchus enodus*. They were procured by the Marquis of Northampton and Mr. Pratt.

5. "On certain Calcareo-corneous Bodies found in the Outer Chambers of Ammonites." By Mr. H. E. Strickland.

These bodies are semicircular, very thin, slightly concave plates, usually corneous, sometimes more or less calcareous. Mr. Strickland regards them as having formed laminar appendages to the animals of the Ammonites, adapted to discharge some unascertained function. They resemble the two expanded valves of *Aptychus*, soldered together; and the author considers them as allied to that fossil, to which he attributes a similar origin.

November 6.—First Meeting of the Session. The President, Mr. Warburton, in the Chair. A paper was read entitled "Observations on the Geology of some parts of Tuscany," by Mr. W. J. Hamilton, M.P., Sec. G.S.

One of the principal features of the district examined by the author, is the existence of three distinct mountain ridges, extending from N.W. to S.E. by S. parallel to the direction of the main chain of the Apennines, and all belonging to the cretaceous system. The valleys between these ranges are filled with tertiary deposits. Secondary formations form the greater part of the mountainous district of Tuscany, consisting of beds of sandstone, indurated marls and shales, and compact gray lithographic limestone or scaglia. These sometimes alternate with each other, and are variously developed in different localities. Fossils are rare in all of them. The tertiary formations are both marine and freshwater. The marine tertiaries attain a height of nearly 1800 feet in the basin of Volterra, where they consist of beds of blue marl and sandy limestones, capped by

shelly limestone. Marine shells are frequent in some of these beds, of which the blue marl is the most extensive, attaining in the locality referred to a thickness of nearly 1000 feet. Selenite abounds in part of it; also beds of rock-salt and alabaster, extensively worked, the mines of the latter by means of regularly constructed mining galleries. The other marine tertiary districts are those of Leghorn, Poggebonzi, Sienna, and Val de Chiana. Freshwater tertiaries were noticed in two localities, forming limestones as compact and having the aspect of scaglia, but well characterized by their peculiar organic remains. Extensive post-tertiary formations of calctuff occur in the valley of the Staggia and of Elsa, and the beds are in places more than 100 feet thick. The rock called "Gabbro Rosso" by Savi, Mr. Hamilton considers as a metamorphic rock derived from the altered marls and sandstones of the secondary formation, acted on by the protrusion of igneous rocks of the serpentine class. At the junction of the Serpentine and Gabbro at Monte Catini is found copper ore (a sulphuret) extensively worked. Besides the serpentine, the quasi-trachytic rock called Selagite, and the basalts of Radicofani, are among the igneous rocks of the district. The author concludes with an account of the remarkable boracic acid works at Monte Cerboli, and of the phænomena connected with them.

MISCELLANEOUS.

HELIANTHEMUM GUTTATUM, MILL.

In No. 36. of the 'London Journal of Botany,' Dr. Planchon has shown that the true *H. guttatum* has not as yet been recorded as a native of Britain, the plant of Jersey and Alderney being truly it, but that of Anglesea proving to be a distinct species. I possess a specimen of the true *H. guttatum*, gathered by Miss H. Townsend at Three-castle Head near Crookhaven, in the county of Cork, one of the extreme south-western points of Ireland, and thus restore it to its place in the British flora, of which it has only just been deprived. The Anglesea plant, called *H. Breweri* by Dr. Planchon, has bracteated pedicels and obovate lower leaves, but *H. guttatum* has no bracts and oblong-lanceolate leaves. It is singular that all our botanists should have overlooked these very obvious distinctions, but probably the extreme rarity of the plants and the small and usually imperfect state of the specimens from Anglesea may somewhat account for it.—C. C. B.

ELATINE HEXANDRA AND HYDROPIPER.

I find that I have fallen into a mistake concerning the discovery of these plants in Surrey. Mr. Newnham does not claim their discovery, which I am informed is due to Mr. Walter Reeves.—C. C. B.

PEDICELLINA ECHINATA.

A zoophyte, new to Britain, the *Pedicellina echinata* of Sars, is found in considerable abundance in some localities near low-water mark at St. Andrew's.—*Proceedings of the St. Andrew's Lit. and Phil. Soc.* Nov. 1844.

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